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Original Contributions.

"FUNDAMENTAL PRINCIPLES IN THE CONSTRUCTION OF PORCELAIN INLAYS."

BY F. L. FOSSUME, NEW YORK. READ BEFORE THE NEW YORK COLLEGE OF DENTISTRY ALUMNI ASSOCIATION.

No end of theories and methods have been advanced on this subject, and I do not claim originality in the methods I present to you to-night, but I wish to state, however, that I have come to these conclusions through my own experience and experiments, and the ivory instruments which I will pass around, I have designed and made, but the idea of ivory being a desirable substance, for the manipulation of gold and platinum foil in the construction of the inlay matrix, was suggested to me by Dr. H. W. Gillett.

In this short paper it will be necessary to limit the subject to those practical fundamental principles employed daily in general practice.

The first of a series of steps to be considered is that of cavity formation, and there is, at the present time, much confusion of thought and not a little conflict of statement as to the most desirable method of extension and formation, so as to obtain beautiful and permanent results. The essential factors governing cavity formation are: The prevention of future decay; the anatomical arrangement of the enamel rods; access to the cavity for construction and removal of the matrix; and the support and retention of the inlay. These will be considered succinctly. Extensive cutting away of healthy, strong tooth structure for prevention or where the cavity is too deep or undercut, is a question to be considered with care; for these places can be rendered immune to further decay by polishing and thorough sterilizing, and the in-

side of deep cavities and undercuts can be filled with some other reliable substance, and then cut to proper form.

The anatomy of the enamel would be too lengthy to present to you to-night, and it suffices to say that frail enamel, unsupported by dentin, ought to be removed, and care should also be exercised not to have too short rods where there is sure to be great stress, as on cusps, sharp corners or at the cutting edge.

Regarding access, I believe that proper space can invariably be obtained by wedging, but where this cannot be done, it is better to remove sufficient tooth substance, so as to be able to construct a perfect fitting inlay than to fail by not having enough room.

Inlays in teeth do not, in their mechanical aspect, differ from other mosaic work, and, by remembering this, the fundamental principle of retention and support is easily understood. The nearer we can approach the cubic or block form, the stronger will be the union of filling and tooth.

Simple approximal cavities should have flat floors and as straight walls as possible. The cervical wall should be cut at a right angle to the floor, and the others at slightly obtuse angles. By this preparation the best possible adaptation will be obtained at the cervical margin, for in setting the inlay the slant of the other walls will drive it against this point. When preparing for contour fillings in the upper anterior teeth, the foregoing principles ought to be closely followed; and, in addition, the labial wall should be cut so as to give the inlay its greatest support, as the stress on these fillings is in an upward, forward direction. Inside the lingual wall, cut a groove in the dentin close to the enamel, and extending from the gingival wall down to the enamel at the cutting edge.

In extensive restorations of fractures, where the pulp is still protected by dentin without decay, the formation of steps for support and also to give increased surface for cement adhesion, is a practice which cannot be too highly recommended, as aside from additional strength of union, the joint exposed to vision is less conspicuous when broken by angles than when in one straight or curved line.

In bicuspids and molars, where, for esthetic reasons, it is ad-

visable to use porcelain, I invariably fill and protect vulnerable parts and margins with metal, especially if difficult of access, and on this foundation construct a porcelain piece to restore and cover that part of the tooth where another filling would be conspicuous. This metal foundation affords excellent opportunity for the formation of consecutive step-like projections.

Where the labial surface of an otherwise sound tooth is discolored, pitted or eroded so as to require protection or beautifying, the best possible form to give it for the reception of a porcelain veneer is a flat surface with the gingival wall cut at a slightly acute angle, and a groove in the dentin, beginning at one of the corners at the cutting edge and extending along the enamel to the gingival wall, following this wall across the tooth, and running down or up, as may be, to the other corner of the incisal edge. If this edge is to be restored across to the lingual wall, the formation is altered by leaving out the groove and forming an interlock, beginning at the incisal edge and running about one-third up the tooth; cut a triangular piece out of the dentin, one point rootward and the other two points being at the edge near the incisal corners, while two of the walls are formed by the dentin, these being slightly undercut; the third side opens at the incisal edge so as to permit the removal of the matrix, which is done by sliding it out.

Enamel edges in all cavities to be inlayed must be smooth, well defined, and wherever possible the inner enamel wall ought to be cut at a right angle to the outer.

In the construction of matrices I use ivory burnishers, and always obtain the form directly from the cavity. There are twelve of these burnishers, and I believe that for this work a more complete set of instruments is not on the market, as every part of any cavity adapted for an inlay can be easily reached. There are two burnishers which are especially novel and useful, and to which I wish to call your attention; the one is for finishing and perfecting the fit of the matrix around the edge of the cavity, the other is for driving the finished inlay home when setting it with cement, and also for holding a partially constructed inlay in position where it is necessary to burnish the matrix in sections. You will also observe that several of the instruments have flat ends which are almost at right angles to the sides, these are indispensable when adjusting the metal to the floor and in cavities with steps.

In burnishing a matrix great difficulty is always experienced in keeping the metal from becoming springy and stiff and pulling away, and frequent annealing is often necessary. In a great measure the use of ivory burnishers overcomes this pulling away, because it does not stretch or iron the metal; and the matrix will adapt itself to the cavity with that dead ease which characterizes the working of non-cohesive gold foil. By being able to have the metal remain plastic the operation can be completed in much shorter time, and this feature should appeal to the busy practitioner and is also in the interest of our patients inasmuch as the expense is thereby reduced.

For matrices in small cavities, I use rolled gold, thickness No. 30, as this metal is very easy to adjust; but in large cavities, where the contraction of the body in fusing might warp the matrix, I prefer platinum foil, 1-1,000 of an inch in thickness.

To obtain a matrix from a compound cavity in one burnishing is extremely difficult, and I have found it easier to get a perfect fit by burnishing it in sections; first the floor and one wall, and then by baking a portion of the porcelain into this, the matrix can be held firmly in place while the remainder is burnished. I generally vaselin the cavity so as to facilitate the removal of the matrix, which frequently fits so closely as to offer difficulties in its removal. The airblast or a stream of water from the syringe is of great assistance in dislodging it.

Porcelain bodies used in inlay work can be classified into the high and low fusing varieties, and as both are used by men who are equally honest and reliable as to judgment and statement, I believe both are valuable to us, although some discrimination should be exercised to select a material which will embody those qualities most desirable and best suited to the individual case.

Some of the essential qualities which a high-grade porcelain body should possess are: density with translucency, to some extent; accuracy in bringing out the selected shade in baking; permanency of color; the power to retain contour and well-defined form in fusing; texture sufficiently fine to permit accurate carving and good surface; minimum of shrinkage, and strength of edge.

However, the manipulation and the manner in which the individual product is treated before, during and after fusing is, in a great measure, responsible for the result obtained; and no doubt

this is one of the reasons for the diversity of opinion regarding high and low fusing bodies.

The selection of color is a matter of some chance, but by giving the inlay a rather opaque foundation body of good shade, the cement will not, after the inlay is set, show through so as to change the color. The matching of enamel body to the tooth, so as to obtain perfect shade-blending, is very difficult, and requires artistic taste and ability, and an especially fine eye to detect the slightest disturbance in the harmony of colors.

By mixing and fusing certain proportions of different bodies, an almost endless variety of shades can be obtained, and by keeping a record of all combinations, many shades in teeth which otherwise would appear hopeless, can be artistically matched. A tooth should never be dry when its exact color is to be ascertained.

The baked and completed inlay should fit the cavity at all points, and not rock nor slide; and the less trimming done after completion the better. That surface of the inlay which is to adhere to the cement must be roughened, and all glaze removed. This can be done by covering that part of the inlay, which will extend outside the cavity, with wax, and etch the back with hydrofluoric acid, or by grinding the glaze off with diamond disks or small stones. Old burs also do the work surprisingly well. I am not in favor of cutting away any substance from the back of the inlay.

There are many so-called inlay cements on the market; I have tried many, and found that most of them do not differ from any of the ordinary zinc oxy-phosphate cements. The qualities essential to a cement with which to set inlays are: it should attain maximum hardness and adhesive strength when mixed to a thin consistency; the powder should be ground very fine to facilitate flow and occupy less space; perfect chemical union between liquid and powder, that there may be no free acid; it should be quick setting.

Before cementing, wash cavity and inlay with alcohol to remove any vaselin or other substance which may prevent adhesion of the cement; mix the cement to a creamy consistency and place a coating over the whole surface of the cavity. No cement is needed on the inlay which is placed in the cavity, and with a rocking mo-

tion is forced gently in, that it may, so to speak, find its place and allow the surplus cement to flow out, otherwise this may pack; then, when almost in place, use a strong instrument and press it firmly and steadily home; wipe one joint quickly to see if it is in absolute place; hold in this position for a minute and then flow paraffin over the joints, and in ten minutes or so the dam can be removed, and the patient dismissed with a request not to disturb it for some time.

PAIN AS A FACTOR IN EVOLUTION.

BY WILLIAM H. METCALF, D.D.S., NEW HAVEN, CONN. READ BEFORE THE NEW HAVEN DENTAL ASSOCIATION.

The Standard Dictionary gives a specific definition of pain as follows: "A disagreeable feeling, usually in its intenser degrees, resulting from or accompanying deranged, overstrained or otherwise abnormal action of the physical powers, and serving as a warning against danger and a spur to effort." This definition of pain (and there are many others) treats it as a physical phenomenon, and as such it is our desire at present to refer to it. In other words, by pain we refer to physical or bodily suffering, and not to mental distress, though the latter form of pain is often a resultant of the former, and vice versa.

Dunglison more pathognomically speaks of pain "as symptomatic, being either acute when sharp or violent, a twinge when short or sudden, a pang when more violent, pungent, gravitative, tensive lancinating, tearing, etc."

It is not our intention to dwell upon the higher aspects of pain as they relate to the powers of endurance or resistance in the individual, except as they go to prove that pain itself, or physical suffering, is undoubtedly a stimulant or incentive to a greater activity and usefulness. This is particularly true in man, and probably not entirely foreign to brutes.

From the amebæ, who have no pain, up through the scale of animal creation to man, pain, or the degree of sensitiveness, increases in the exact ratio to the degree of mental activity, or capacity; and in man this same law of progression seems to apply. It is this thought which leads us to our subject in hand, viz.: that pain is a leading factor in evolution, and we mean by this, first: the evo-

lution of the animal kingdom with perfect types as its apparent end, and on a higher scale, the evolution of Therapeutics. Man himself we believe to be microcosmic; the strongest link in the chain, contradistinguished perhaps from the brute, by virtue of his superior mental powers, but also subject to the same laws of evolution upon a higher plane, and probably in a discreet degree.

We will not dwell upon the interesting history of medicine, which dates back as far almost as history itself. The primitive and superstitious methods used by the ancients no doubt answered the requirements of the ages in which they were practiced; but we note that the improvement in methods corresponds exactly to the apparent progress of intellectuality. Some of us here to-night are old enough to remember the common practice of giving large doses of mineral concoctions, such as calomel, the iron chlorid (still largely prescribed), tartar emetic, also still used. We also remember the strong cathartics, made of aloes, calomel, colocynth, etc., and we remember the many powerful vegetable poisons which were administered freely and which, thanks to experience and a higher education in the natural order of things, have been greatly reduced, and doses of golf, tennis and horseback judiciously substituted. Nevertheless, show us a symptom, even in our enlightened time, and Materia Medica has its dose, and often the poor sufferer must conquer both disease and drug or die. I am here reminded of a letter written by a young practitioner of medicine, who had just started in Chicago, to a friend in a neighboring city. It read:

"Dear Charley: I have had my first patient. He is dead. Yours truly, Jack."

Is it not time that we looked about us for the causes of disease, letting symptoms, in a measure, take care of themselves? But you say, "Is there a way to diagnose the cause without first carefully noting the symptoms?" I reply, there certainly is, but it cannot be utilized until we first become thorough masters of anatomy and physiology.

Anatomy is fundamental, giving us the proper location of bones, muscles, nerves, the vascular system, integuments, etc., and their exact relation to each other, and physiology is the higher anatomy of use.

Anatomy shows what machinery we possess physically; physiology is utilitarian, showing us how to use it. The human body is like a

great machine shop, each branch connected electrically with a headquarters, which corresponds to the human brain. If any obstruction occurs anywhere, at any time, a message is sent immediately to headquarters, and it is oftenest perhaps a message of pain in greater or less degree. What we term disease (dis-ease) is but the abnormal action of some part of this anatomy; and pain is nature's signal sent through the sensory nerves to the brain, or sensorium, as a warning. This brings us to the interesting part of our subject, viz.: the character and action of these sensory nerves. Their anatomy and physiology. As dentists we, of course, are probably most interested in oral anatomy and physiology, including its reflex nervous and circulatory connections, which, by the way, include a large field. This evening, therefore, we can only refer in a general way, and that briefly, to the causes of pain and the methods of treatment which are suggested by our experience in the practice of dentistry. Without going into the anatomic and physiologic details of the mouth and face, which you will admit are intensely interesting and absorbing, we will confine ourselves to a few of the pathologic phenomena which are constantly presenting themselves to us as dentists and which bring pain and discomfort to our patients.

Nerve irritation or excitation is referable to five causes: electrical, chemical, mechanical, thermal and mental. In the practice of our profession it is our custom in treating or alleviating pain in the oral region to first diagnose the cause. If it is mechanical, as in malocclusion, we change the bite; if chemical, we prescribe mouthwashes; if electrical, we break up the current; if thermal, we protect by non-conductors; with mental causes we have little to do, although an occasional word of advice or warning, judiciously used, may by suggestion so change the imagination, especially with certain temperaments, that immediate and most felicitous relief will follow. A few days ago we had a very nervous old lady, who was evidently on the borderland of hysteria, for whom we wished to extract a very loose, solitary molar which was unregenerative; she was parleying, bemoaning, apprehensive and absolutely repulsive in her actions. We made the remark to her: "Madam, if you were our own sister we would not allow her to run the great risk of having that loose tooth lodge in her wind-pipe at some time when she was inadvertently coughing or eating." That remark did the business; the tooth was easily extracted and she was as calm as a summer sea.

Children also work themselves up into a state of painful apprehension, when a few words of counter suggestion, properly and propitiously administered, often save a world of trouble and a mint of time, drugs to the contrary notwithstanding.

We as dentists are intensely interested in minute nerve anatomy; because it has much, aye, almost everything to do with the phenomenon of pain. The latest research in this direction comes from Prof. W. B. Hardy of Cambridge, who tells us that the colloids of nerve substance carry in their solutions either negative or positive charges of electricity, and that opposite charges will precipitate them. With this hint to work upon, Prof. Albert F. Matthews of Chicago University found by experiment that the colloid particles or ions possessed positive charges, and that they induced in the water of their solutions negative charges for themselves, thus creating a negative current and, if we may use the phrase, by electrolytic coalescence. He also demonstrates that when a nerve is negatively charged in excess the colloids change to a jelly, which is its stimulative stage, or a condition of excitement; and, on the contrary, this irritability is decreased whenever the solution is more permanent. He also states that heat diminishes the irritability by causing the solution to be more stable, and cold, or the absence of heat, increases stimulation by making the solution less stable. Gelation responds to the higher temperatures, and the nerve is stimulated. He also tries to prove, and quite reasonably it seems, that the different kinds of stimulation correspond to the different senses. Touch, for instance, stimulates, as do also taste, sound, odors and light, by forcing the colloidal particles together. Nerve impulse is therefore promoted, as you can see, by those alternate changes of the colloidal particles of nerve tissue and water.

These simple but intensely interesting facts from the experiments of Prof. Matthews are startling and are made more important by the fact that Prof. Loeb, one of his former colleagues at Chicago University, but now of California, not only confirms them but carries them forward into his wonderful discoveries as to the causes and nature of muscular contractility, which the colloidal nature of muscles made possible. We mention these facts because they are of recent origin and appeal to the rational mind as a means to the further control of nerve currents in a more intelligent manner; and I trust that the knowledge of these phenomena may help us as

humanitarians and dentists toward the more thorough alleviation of suffering. It has been our practice for many years to advise our patients to relax every muscle during painful operations; and when this is done much pain may be avoided. It is a difficult thing to do, but may by practice be accomplished. Now, according to Prof. Matthews, we have a reason for this in the fact that contractility of muscular tissue acts as a stimulant or irritant by increasing the gelation of the nerve colloids. In other words, the mechanical stimulation caused by dental instruments and aided by the contraction of muscular fibrillæ promotes also the irritation of nerve tissue. This theory, which according to Prof. Matthews is practical, seems to satisfactorily explain drunkenness and the effects of ether and chloroform. All anæsthetics dissolve fats, and the nerve colloids are largely fatty in substance. Alcohol will also, to a degree, dissolve the colloidal substances of the brain cells, thus interfering with the normal motor and sensory action, and this by making the solution more stable. Here, then, is a great truth, viz.: the solution of these colloids decreases nerve action, and another important truth is that irritation or stimulation of nerve substance is a process of the jellying of these colloids, or ions, forming, as it were, minute batteries, which give off negative currents, which in turn go to stimulate other colloids to coalesce, and so the impulse is carried on. Mechanical stimulation, or touch, seems to bring about a corresponding effect.

I have also experimented, somewhat, along the lines of inhibition. We all know that nerve sensation is reflex. A message, as it were, sent to the brain or sensorium is returned to the part touched or irritated and demonstrates feeling or pain. By inhibiting at the Gasserian ganglion and the various branches of the fifth nerve, viz.: at the ophthalmic, superior and inferior maxillary, and at the supra-orbital branch of the ophthalmic I have sometimes produced favorable results in the palliation of pain. The infraorbital and mental branches of the fifth may be plainly felt at their respective foramina, and by intelligent and continuous pressure, as they are subcutaneous, their nerve impulses may be often quite perceptibly controlled. I have repeatedly quieted and thoroughly controlled facial neuralgia by first inhibiting and afterward promoting the circulation by stimulating the nerves indicated. Pardon me if I mention one case, that of a lady of about forty years of age, which particularly interested

me. She came for dental work. When she first arrived she said that it would be impossible to have her teeth worked upon then, as she was in such agony with facial neuralgia in her forehead over her left eye; that it had lasted for five days. On examination I found a bunch, or swelling, over the supraorbital region about an inch long and half as wide. It was inflamed and tender to the touch. Here was a chance to demonstrate; so, telling her that I might possibly be able to help her trouble, I inhibited at the ophthalmic branch of the fifth pair, anterior to the Gasserian ganglion, and at the same time brought pressure to bear on the nerve at the supraorbital foramen until the pain quieted. Then I stimulated the circulation by manipulating the swelling on her forehead, and after breaking up the congested condition there stimulated the aforementioned nerves, and she informed me that she had no pain whatever and could not seem to find words enough to fully express her gratitude, and I worked for her for over an hour upon her teeth. Five or six days afterward she came again and reported that there had been no recurrence of pain. Much suffering in the form of facial neuralgia may be alleviated by the intelligent dentist if he will but study the control of the nerve currents; but he should always remember his professional obligations to Doctors of Medicine, only treating those cases which immediately interfere with dental work or are directly associated with it. How much that is therapeutically palliative and humanitarian may be discovered in this direction remains to be seen. Let us hope for great things. We are living in an exceptional age of remarkable scientific discovery, and it should be an honor to us to be permitted to have even a feeble part in it. There is dignity in labor, but in such labor there is more credit than the word dignity implies. We should remember that every mite which we contribute toward the common cause of humanity, either in art or science or moral impulse, adds wealth to the common good, and the common good seems to be the ultimate aim of evolution. Our object should be not only to prolong life, but to make life worth the living. Wonderful possibilities lie almost within our grasp. The medical and dental professions have been for years unselfishly striving to make life more tolerable for the human sufferer. They are noble vocations, and this nobleness is emphasized by the heavy responsibilities which they entail. The ethical changes which we see taking place around us and throughout the world are marked and

often startling, and it is apparently in keeping with the laws of evolution that scientific discovery should keep pace with them, and that by and by pain will cease to be a factor.

ONLY ONE WAY TO MAKE A CROWN.

BY T. J. HATFIELD, YORK, NEB.

In the June number of THE DENTAL DIGEST I read an article from the pen of Dr. Edwin W. Harlan of Jersey City, N. J., entitled "Accurately Fitting Seamless Caps on Richmond Crowns." When reading many of the articles written for our journals I often wonder why men use so much time and talent in this direction as is so often done. A good thing advanced in the right direction is energy well applied, but excellent ideas may be incorporated with poor plans and a vast amount of energy is wasted. A person may do good work making a Richmond crown, but his plan is wrong; it matters not how skillfully he may manipulate the material, the crown when completed only represents in a small degree a natural tooth, for which it was intended.

No one can make a banded crown, grind and properly fit a facing to it, leaving a natural appearance at the portion called the neck of the crown, without placing the band so far under the gum as to permanently injure and irritate the pericemental membrane, which will cause continued inflammation, and thus a recession of the gum, and end in the loss of the tooth. To place a band upon a root so as not to permanently injure the pericemental membrane and then grind a facing to properly fit it may be done, but such a crown will be bulky and unsightly and not give the individual expression or harmonize with the adjacent teeth.

The entire process of backing up a facing with gold is in discord with Nature's material laws. There is no harmony between the elements of porcelain and gold and it is not possible to make them unite. The contraction and expansion of gold is disastrous to porcelain when placed in direct contact with it. A facing backed up with gold has nothing to hold the porcelain to the gold but the pins; and if there is not a level plain from the pins to the margin of the porcelain the contraction of the gold in cooling will either check the porcelain or stretch the pins. This defect may not show from the labial or buccal surface, but the heads of the pins will be raised from

their sockets and that portion of the porcelain surrounding the pins will be strained, checked or torn loose from the main body of the facing. When we remove a crown from the investment, after soldering and looking with intense interest, as every dentist does at this critical moment, we breathe a sigh of relief and compliment ourselves that there is not a check visible. Do not be too certain, for after the crown has been in use for some little time we are often amazed to note that the facing has come off. It was broken at the time of soldering and only needed a small amount of stress to dislodge it, leaving that portion of the porcelain surrounding the pins in place on the backing. The gold backing in no degree represents the contour of the lingual surfaces of any of the six anterior teeth. If the incisal edge of the facing be overlapped with gold the liability of a fracture of the porcelain is increased and renders the crown the more unsightly.

These objections are so well understood that no one will deny them. I wish to repeat a statement I made in a paper read three years ago last May before the Nebraska State Dental Society, entitled "Poreclain versus Gold in the Dental Art."

"Any man who puts a band of any kind on a root for any purpose is working against the best interest of himself, his patient and his profession."

Roots are banded to make them stronger and to keep them from splitting. Dr. Harlan says: "The root must be trimmed so that the circumference will be a degree smaller at the end than at the point under the gum, where the edge of the cap will rest." This must be done in order to place the cap. I do not say to make the cap fit, for there never was one fitted to a root so as to strengthen it. In order for a band to add strength it must not only go on tight but must *draw,* either by being driven upon an inclined surface to a greater circumference or by contraction upon cooling. The portion of the root which was trimmed away to prepare for the band was compact and strong. *It fit.* The removal of this tooth structure weakened the root to prepare for something which does not give any additional strength.

No dentist would think of putting a band upon a root so broad as to impinge upon the pericemental membrane, but so often we see that the band has caused a recession of the gum. How many banded crowns have you seen that do not cause inflammation of the

surrounding delicate tissue? A band has been put on a root and in order to do so the tooth structure has been trimmed away from under the gum and by careless, indifferent management, or in order to make the crown look well when completed, the band is forced to a depth, cutting the dental ligament, imbedding itself or resting heavily on the alveolar border, which causes a recession of the gum, absorption of the alveolar border, and thus the complete destruction of Nature's band, which *does* give strength to the root. A healthy alveolar border and a normal pericemental membrane has more to do with the complete and continued success of a crown than any other one thing.

There is only one way to make a crown, just one. I described the steps for making this crown in detail in the paper to which reference was made. I will, very briefly, describe it again, and will try to make it plain so as to be easily followed by those wishing to do so. Prepare the face of the root by cutting slightly below the gum line. Do not cut the gum tissue so as to make it bleed. Cut the face of the root concave from the canal to the lingual margin. For the post make the canal round, straight and all its length the same size. Use round iridio-platinum wire for the post and of a size fitting the canal tightly. Use 32-gauge platinum plate for the disk to cover the face of the root. Cut the disk large and pass the post through it to the exact length of the prepared canal root. Solder the disk and the post together with platinum solder. When the post is in position in the root there should remain enough of the post below the disk to allow the pins of the facing to come in contact with it. Place the post and disk in position on the root and burnish the disk to the root; if the root has been made smooth and the margins sharp the outline of the root will be plainly marked upon the disk. Remove the disk and trim nearly to this line; place the disk in position again and burnish carefully and mark the line of the margin of the face of the root distinctly upon the disk; remove the disk and trim carefully to this line; replace in position and burnish to insure perfect adaptation. Take an impression in modeling compound, not in the ordinary way, but carefully in this manner: while the compound is warm take a piece about the size of a pea, press it between the adjacent teeth and over the post and disk; see that the compound in the tray is warm; press it to place and *allow it to remain there until cool.* Remove the impression, dip in cold water, re-

move the post from the root and place it in position in the impression. Now take a bite, make the models and varnish them with shellac.

If the patient should leave the office while the crown is being completed close the canal by placing gutta-percha around a common tack and press to place while warm, so that the gutta-percha will close the hole; cover the face of the root and gently press the gum away.

Remove the post from the model by cutting tunnel to the point of the post and then push the post out from above; replace the post, select a facing, which can be better accomplished by placing in the patient's mouth. Cut the pins of the facing so that when turned in against the porcelain the ends will touch each other; grind the facing so that the pins will rest upon the end of the post and fasten with sticky wax. Carefully remove from the model, shellac the anterior surface of the facing and invest. Remove the wax, dry and solder the pins to the post with platinum solder. Place the frame of the crown in the model or, better in the mouth of the patient. Complete the crown by backing up the lingual surface with porcelain in the proper manner. You will have a crown that can be set in the dark, if need be, one which will never be detected as a crown and one which will not irritate the gum nor leak where it unites with the root.

This same process will apply to molars and bicuspids, except that I do not use facings for them, simply building them up with porcelain. I have used this method for crowning for eight years and I am simply delighted with the results, so much so that I feel guilty when I use shell crowns for bridge abutments because they are banded crowns.

Alveolar Abscess May Cause Change in Cellular Tissue.—A long-continued alveolar abscess, though it may become chronic in character and little noticeable in appearance externally, may be the result of establishing an eventual physiological disturbance that will manifest itself in some form of disease quite remote from the locality in which the active process is going on. It has been said by an able writer that every cellular change that deviates from a normal function in the body means a loss in the entire function eventually if continued for any definite length of time. Therefore, any process that manifests itself in abnormalities will eventually lead to some changes that result in some abnormality.—Dr. G. W. Cook, *Amer. Dental Jour.*

Digests.

LIMITATIONS OF DENTAL EDUCATION. By G. V. Black, M.D., D.D.S., Sc.D., LL.D., Chicago. It is a self-evident proposition that such an education in dentistry as will fit a suitable number of young men to serve the people in the best possible manner will be the best that can be given. Too rigorous a requirement will limit the number so that there will be too few to serve the people; too lax a course will fill the profession with incompetent men. Therefore the best education we can rightly require is not the highest degree of education the primary liberal arts and professional schools might give.

There are many influences acting to limit the education that may be given. These are closely akin to those which limit the education of the general public. It is desirable that education for either a business or professional career be such as our modern college of liberal arts give, supplemented by a business or professional training. It must be clear that in the present organization of society such a course of study for everyone becomes impracticable and would so limit the number entering the dental profession that there would be too few to properly serve the people. Such an education requires that the first sixteen to twenty years following the sixth year, or school age, shall be devoted to school work, and the business or professional training obtained later. If this latter demands three or four more years, the person will be twenty-four to thirty years old before he is ready to enter upon his work. While it is desirable and we may expect that a considerable number of young men will obtain this education in the shorter time mentioned and enter the ranks of dentistry, thus equipped, it is clear that we cannot at the present time, or at any time within the near future, demand this as the minimum limit. At present the earning power of the average individual is insufficient to enable him to spend this proportion of his life in educational preparation. Further, advance in age tends to bring fixity of notions for most men and on the average those who enter the professions early in life gain a better discrimination of conditions and a higher degree of finger skill when that is demanded, as is eminently the case in dentistry. This is an additional reason why men should become dentists as early in life as a reasonable education will allow.

We as a profession serve the people in relieving such of their

distresses and ills as occur from diseases of the teeth and associated parts, and as such are a part of the medical profession. For our purposes we may consider the education necessary to those who follow the law, politics, divinity, medicine, dentistry, civil engineering, etc., as among these we find the orders of life-work that, aside from the questions of food, clothing and the more ordinary forms of shelter, mean most to the welfare of men and the progress of civilization. These and some other callings that are very nearly associated with them, constitute what may be termed the professions. The persons who enter upon these as their life-work are supposed to devote themselves to the welfare of man and to the communities in which they live. If some serve the state or nation instead, it in no wise changes the obligation to serve in the interest of humanity and the advance of those phases of science on which civilization is founded. In this the professional man is different from the laborer or tradesman. In the trades, manufactures or building, the business is in the use of capital or finance in buying and selling, or the exchange of commodities, and the man uses his mental endowment, quickened with his educational preparation together with his capital, in the exchange of goods among men that each may obtain that which his needs or his tastes may demand. In this the goods are the subject of sale and purchase. The professional man sells no goods. In general terms his equipment is his mental endowment supplemented by his training, which has become an integral part of himself. That he cannot sell, but it enables him to labor for the benefit of man.

A man in difficulty with his neighbor over a question of property may choose his attorney, but is not in position to determine the value of the attorney's advice, nor choose what it shall be. He cannot buy of his attorney. He may accept the service and pay the fee, but the attorney determines the character of the service. The sick man or his friends may choose a physician, but the physician must determine step by step what the treatment must be during the progress of the case. While he is by usage entitled to his fee, there is no question of barter in the service rendered. His obligation is to use his full energy and best judgment for the benefit of his patient independent of any other consideration. So also the dentist ministers to the ills of man in his legitimate field. The object of his special education is to fit him for determining that which will most certainly give free-

dom from suffering and best fit his patient for future usefulness. The patient can no more determine what this may be than the man who is sick with a fever can determine the medication suited to his case. He must depend upon his dentist. The professional man doesn't advertise or sell; he serves; he uses his mental endowment and special training to relieve the difficulties and distresses of men, and for the benefit of society or of the state.

If we can admit that there are differences in the degree of moral obligation among men, the moral obligation of the professional man must be greater than that which rests upon any other, for those whom he serves are dependent upon his moral integrity and his skill to a degree that is greater than the obligation of any other. His obligation to obtain the best practicable primary and professional education is in the same ratio.

Just as the medical profession becomes proficient in its service, the intelligent public comes to depend upon its members for that service and make use of their training and judgment. As it is in the medical profession, so it is in all others. As the civil engineers as a profession become proficient in their calling, those who have large engineering works come to depend upon them for advice and plans of building. As dentists become proficient in their calling and are enabled to enforce their opinions by the results of operations, the people come to depend upon them and make use of the service they can give.

This brings us to another proposition. In order for the service of the skilled professional man to become available to the people, the people themselves must have that degree of education in the use of that service which will enable them to employ it efficiently. This may be said also to include in a lesser degree the financial means of its employment. The early settlers in this country were not in position to employ the highest skill of the architect for the planning of the buildings they needed; a much lower degree of skill which they found among those not especially trained served their purpose, and in the main served it well. As another illustration we may take electrical engineers, a class of professional men who have sprung into existence within the memory of most men of middle age. They may devise electrical apparatus for the use of the people that is good and well calculated to do the work designed, but before it will become available for extended use the people must learn the condi-

tions of its use and the results to be accomplished. In other words, the professional man cannot make use of the higher degree of training without a corresponding advancement among the people whom he serves. It is not necessary that the people all become electrical engineers in order to use electrical instruments and derive the benefits of their use, but the conditions of use must be learned. The highly trained physician who is placed in a community of persons who do not know the benefits to be derived from his employment will be unable to give them that service which he could give to a more intelligent community, either directly in the curing of their ills or in protecting them from unsanitary conditions. In most instances the professional man needs, to enable him to do the best service, that the intelligence of the community shall support and supplement his efforts. So it is in dentistry; we as a profession cannot do that which should be done for a people who do not know of the benefits to be derived, and who are unable to do their part in making use of the treatment that we may give them. The efforts of the dentist also must be supplemented by the intelligence of the community which he serves.

In the professions it seems useless to place the minimum degree of education higher than the intelligence of the people as a whole will support by a sentiment that will cause a sufficient number of young men to enter into the work. A higher degree of education may serve in the development of science, but cannot render the immediate service to the people that is designed. The state demands that the service to the people be a reasonably good service. The state does not demand the highest efficiency that may be obtained by a liberal education, but a service that will be reasonably safe, and demands a certain minimum education before it will license practitioners. This is done for the safety of the community, protecting individuals who cannot protect themselves. This is done also under the theory that all are entitled to a degree of service that is sufficient to render them useful citizens and give them that reasonable protection against their ills which professional service can render. It often happens that a degree of service less efficient than that which will be demanded by the more highly educated community will be very much better than no service.

A condition has arisen in England in which this is sharply

illustrated. A number of years ago the British Dental Association went before the House of Commons with a bill to regulate the practice of dentistry, which became a law. This law was supposed to prohibit anyone practicing who had not passed through a prescribed curriculum of study and had been licensed regularly for practice. When supposed violators of this law were brought before the courts, the decision was that the wording of the bill prohibited persons from announcing themselves as dentists or dental surgeons, or words to that effect, in any printed matter, signs, bills, door-plates, etc., but that the law did not prohibit the act of practice. Therefore, anyone can practice dentistry in England provided he does not use this means of announcing himself, and many are so practicing. Under these conditions the British Dental Association by its Committee, recently appeared before the House of Commons again, asking that a new bill be passed which would probihit the act of practice. The Committee of the House of Commons to which this bill was referred, entered into an exhaustive study of the subject, called witnesses and took testimony as to the effectiveness of the dental schools in England and the needs of the English people, and the conclusion was that entry into the dental profession through the schools had been made so difficult by the length of time and the fees demanded, that the schools were not qualifying a sufficient number of men to serve the needs of the people, and therefore sharply refused to interfere further until this could be done. The grounds for this decision were that if the people could not have a highly efficient service, they must be permitted to employ a less efficient service, as being better than none. The requirement for the L. D. S. in England was a primary education about equal to that given by our high school, and four years' training in dentistry, with fees that on the whole ranged very much greater than those in this country. The dental schools in England have dropped from the four year course to a three year course in consequence of this decision, with a corresponding diminution in fees. We have had nothing of this kind in this country, and with our present progress we seem in no such danger, but if we should ever render the entry into our profession so difficult as to seriously reduce the number of practitioners, our legislators would speedily remedy the matter. We ought to be able to maintain a higher

grade of dental education than England for the reason that a very much larger percentage of our people make intelligent use of dentistry and give us stronger support.

In order for the usefulness of dentistry to be fully received by the people, they must become intelligent in the conditions of its use. The development of the ability to impart this is an essential part of dental education. This must be taught by the dental profession and placed before the people by each individual in his daily practice. Its first element is confidence in the benefits to be obtained. Coupled with this there must grow up in the public mind an appreciation of the conditions under which efficient dental service can be rendered and the necessity of submission to these conditions in order that the benefits may be derived; and finally, a range of observation by many people of the results of dental operations which will give a fair judgment as to what may reasonably be expected. This will develop a power of discrimination that on the whole will give a judgment between success and failure of individual operators in giving this service that will have in it that element of correctness that will act as a spur to excellence in the body of the profession, and the weeding out of careless or incompetent men. In this it is not in any wise expected that the public will become dentists any more than it was expected that all the people would become electrical engineeers. This is to be taught almost entirely by practitioners in their daily intercourse with patients in their offices, and through them diffused to the general public.

Pretty careful observations through many years convince me that little can be done in this direction by public prints which are supposed to give the people information regarding dentistry and the care of their teeth. In this matter, however, we as Americans seem to have done better than the dentists of any other country, if I may trust my own observations abroad. There is a larger proportion of American people who make use of dentistry with a fair degree of intelligence than any other. In some investigations of this made a few years ago I found at that time the use of dentistry by the American people had more than doubled within ten years, and I am satisfied this rate of increase is continuing, and in ten years from now it will require many more

dentists to do the work required by our people than we have now in practice.

The different states of our common country have passed laws regulating the practice of dentistry. Laws something similar to these are now in force in every civilized country on the globe, so far as I know. These have in every instance been in the main such as have been recommended by the dentists of the individual states. The first laws were timidly drawn and even more timidly enforced by the boards appointed to administer them. These have been replaced by new and improved laws so that in the large majority of states the boards appointed have authority sufficient for a fairly rigorous regulation of dental education and practice. Especially it is their duty to see to it that every person entering practice exhibits the ability to give reasonably effective service. Most of these state boards have the right under the laws to determine the education, both primary and professional, of persons entering the practice of dentistry, so long as the requirements are reasonable. They have also generally the right under the laws to examine the work of dental schools and to judge them as to their reputability, basing this upon compliance with reasonable rules and regulations. Therefore, the schools are to that extent under state control. This is done that the people may be assured of reasonable proficiency in those licensed to practice. Practically the dental profession controls the provisions of the laws that have been passed and should control those that may be passed in the future, for it is their business to study the needs of the people. In the same way attorneys control the rules and regulations governing the practice of law, and medical men control the formation of laws governing the practice of medicine, etc. This is done by advice to legislators. Generally these act in the capacity of societies or associations through committees which advise with legislators as to what laws will serve the people best.

This being true, every dentist is interested in these laws and should study these questions with the greatest care in order that he may influence them favorably. This is a necessary part of his professional duty as much as to properly care for the cases which present in his office, for he can often serve the people better by his efforts in this direction than in any other. While it is true

that the governors in most of the states appoint the boards who administer these laws, it is also true that most governors will listen to and be in a degree controlled by the wishes of the professions in the personnel of the appointments, when the necessities are wisely and judiciously presented. Every man in reputable practice should be ready to advise and assist, in connection with his association, in this work, and therefore should become as intelligent as possible as to the conditions and necessities in the formation of laws regulating dental education and practice, to the end that the people may have the greatest benefit possible, and his profession as a whole derive the greatest honor.

In the past the faculties of the dental schools have had their association, and the members of the examining boards have had theirs. These two associations have usually met at the same time and place, but separately, and with occasional differences of opinion, harmonized by joint committees, have done most excellent work and dental education has prospered under their joint influence. However, the National Association of Dental Faculties has always been a turbulent body because there have been, as it seemed to me, so many conflicting interests to be conserved. Fifty or more dental schools have been banded together in one body and have been endeavoring to form rules under which all could work. These schools have been differently organized; some are departments of great universities that are able to tide them over a temporary shortage of funds; some are departments of state universities which may receive state aid; many of them are the property of individuals or stock companies which are dependent upon their incomes from year to year for their existence, while a number are actually supported by the liberality of the professors in charge.

Under these conditions a shortage of students that will diminish the income will affect some schools more seriously than others. Yet I believe there has been much honest effort by all concerned to do the best things for the general promotion and improvement of dental education. Under the influence of these two bodies, the educational requirements for entry into the dental schools was advanced from practically no inquiry in 1884, to the minimum of two years of high school in 1901, and from a rather uncertain course of two years of about five months each

in 1884, to the minimum of three years of seven months each in 1901. During this period dental schools enjoyed very remarkable prosperity. The number of schools increased from eighteen in 1884 to fifty-four in 1901, when a further advance to a course of four years was voted almost unanimously by the Faculties Association. Personally I did not favor this form of advance, preferring two more years of high school, but it was so evident that it was the choice of a large majority, that I voted with the rest. It had already become apparent to some of us that there was coming a time of diminished attendance in dental schools. The country was in the enjoyment of unparalleled prosperity. There was and has continued to be profitable employment for energetic young men. Wages have been higher than ever known before. Under these circumstances a fewer number will turn aside and spend three or four years and pay the fees to acquire a professional education. Under these conditions the four years course became a stumbling block in the National Association of Dental Faculties. The first matriculation period for the four years course showed a great reduction in numbers of freshman students, and many of the schools took alarm and clamored for the rescinding of the order for the four years course. After a stormy session, adjournment was had with only the barest majority for the continuance of the four years' course. Clearly this was too small to constitute a safe working margin. Shortly afterward a special meeting was called, which rescinded the four years' course, returning to the former three years' course of seven months. While there was great dissatisfaction over this matter, I am of the opinion that the general intention of every member was good. While personally I worked with all my might for the maintenance of the four years' course, each of those opposed to me was probably just as honest in his view.

If we now examine the work of the dental schools in the graduation of students for the twenty-two years since the organization of the National Association of Dental Faculties in 1884, we find that something over thirty-three thousand young men have been graduated. The actual official reports that I now have give 32,701. If I fill in the blank years (those of which I have not yet the reports) by an estimate based on the average of

the two preceding and two succeeding years, it gives 33,598 as the total.

TABLE BY YEARS OF GRADUATES IN DENTISTRY FROM 1884 TO 1906.

YEARS.	GRADUATES.		
1884	421		
1885	503		
1886	497		
1887	620		
1888	758	11,302.	
1889	802	Average per year 869 for the	
1890	983	first thirteen years.	
1891	1,242		
1892	1,474		
1893	415		
1894	902		
1895	1,278		
1896	1,407		
1897	1,683		
1898	1,960		
1899	2,168	21,401.	
1900	2,149	Average per year 2,140 for	
1901	2,370	the last ten years.	
1902	2,261		
1903	2,285		
1904	2,291		
1905	2,711		
1906	1,523	32,703	Total reported
	Add estimate	879	for years not
	reported.	33,582	Estimated total.

This is certainly not far from the actual number. Of these a few have gone to other countries so that the best estimate I can now make is 33,000. But these figures do not fully represent the facts. During all of the first half of this twenty-two years a large number of dentists entered practice without attending dental school. At first the boards examined all applicants, but gradually men found that the easiest way to become able to pass the examining boards was through the dental schools. Within the

last ten years practically all have passed through the schools. During this ten years the graduates of which I have record have averaged 2,140 per year. As forty years is the average expectation of life of persons of twenty-one to twenty-six years old, this number annually would maintain a force of 85,600 dentists.

Of the dentists now in practice in the United States and Canada, we have not very exact data. Polk's Dental Directory is probably the best available. This for 1906 contains 35,274 names. But no such book contains all. If we add to this ten per cent to cover omissions we will have 38,801 as the total number.

The expectation of life of men entering dental practice, assuming that the ages will average twenty-one to twenty-six, is forty years. Assuming that all of the men actually spent their life in practice, the graduation of 970 men per year would keep up the number. But many men, how many we do not know accurately, drop into other employments. If we assume that twenty per cent are lost to dentistry in this way and another ten per cent is necessary to provide for the increased number of dentists required, it would require 1,333 additional men annually to provide the necessary number. Or even upon the supposition that those going into other employments were thirty per cent and neessary to provide for the increased demand were twenty per cent, 1,663 graduations per year would be necessary. From this it would seem that the number being graduated is very excessive. And yet if we look carefully about us we find that the development of the use of dentistry by our people is so rapid that there is no notable excess of dentists. Those in practice to-day seem to be doing fully as well as those of ten years ago.

Some of our graduates fail for various reasons to enter into practice, and many, perhaps of the less competent, drop out after a few years. Those of us who have been endeavoring to keep in touch with our graduates have some appreciation of this and yet it would be difficult to make a satisfactory estimate for the whole country. It is sufficiently certain, however, that there is no immediate danger of a shortage of dentists to serve our people, even though the number of graduates should be somewhat reduced for a few years. Under these circumstances the state boards seem to be fully justified in demanding a better educational qualifica-

tion of students entering the dental schools, and further improvement in their professional training as well.

Under the conditions existing when the Faculties Association rescind the four years' course and returned to the three years' course of seven months, continuing the requirement of two years of high school for entrance, the National Association of Dental Fxaminers refused to accept their decision.

After a careful study of the conditions (which I have herein more fully given) they advised their constituent state boards to require of the dental schools a course of three years of nine months' each, or an equivalent in the form of thirty-two weeks of teaching, excluding holidays and including Saturdays. With this additional time the requirement as to primary education was advanced from two years of high school to graduation from an accepted high school, or its equivalent education to be determined by examination by the state superintendent of public instruction or equivalent officer or his deputy. This was accepted by the state boards and the schools were asked to comply with this requirement independently of their membership in the National Association of Dental Faculties. Within a short time after the announcement of this decision of the state examiners their proposition was formally accepted by a majority of the dental schools, but has been sharply resisted by a considerable minority. It is desirable that all of the dental schools accept these conditions as a permanent settlement of the controversies that have marred the progress of dental school work for several years past.

With these most disturbing subjects of contention transferred to the state boards, settled and out of the way, there is most important work remaining before the National Association of Dental Faculties in the improvement of the curriculum and associated educational matters that should absorb its time and energy in the years to come. These difficulties and disagreements have been a large factor in the influences that have diminished the matriculations in dental schools for the last few years. In the unsettled conditions that have prevailed young men desiring to enter dental schools have not known what to expect or what would be required of them. Sometimes they have been uncertain whether or not they could be examined and licensed to practice by the state boards if they graduated from the dental school of their

choice, and in the maze of disagreement and unsettled condition of affairs in dental education, have turned to other lines of employment.

It is high time for the general good of our people and of the dental profession, these difficulties should be ended and settled in a way that will give permanence for years to come. Personally, I am fully convinced that the plans of the examining boards which have been given and have been accepted by a majority of the dental schools should be fully accepted by all as the law of minimum requirements. With this should go the understanding by all that this minimum requirement shall not again be disturbed for many years to come, with a sentiment within the dental profession as a whole that will as rapidly as practicable enforce it in all of the state laws and in all dental schools.

The members of the faculties of dental schools are, by a sentiment existing in the dental profession, prohibited from becoming members of dental examining boards while engaged in school work. Members of the examining boards have none of the perplexities that arise by reason of personal interest in the success of a particular school. They are free from that embarrassment to their judgment in dealing with these questions, and, other things being equal, are more likely to arrive at just conclusions and permanence in their requirements.

There is and should be nothing in this minimum requirement that will prevent individual schools on their own initiative from adopting a higher standard whenever they may see the way clear to do so, but this in no case should become a state requirement. It is quite true that this requirement of students will not fit them for practice as efficiently as many of us could wish or as may be required by many communities. For this we must depend upon those who of their own notion will come to us with a higher education to begin their professional work and the personal initiative and further study of the more industrious men after leaving school. Of these we may reasonably expect a much larger number in the future than we have had in the past. The professional sentiment, and in many communities, the popular sentiment, will require this, but it need not become a matter of law in order that we may have that reasonably efficient service that will be sufficient to protect our people. Indeed, it is not the function of the

professional school to give its students the highest order of efficiency, but rather to give them such a basis for future study that this, combined with their experience in practice, will round out the fully developed efficiency of the higher order.

In conclusion, I want to appeal to every practitioner to study this whole matter of the limitations of dental education with great care to the end that you shall not expect the impossible of dental schools. Remember that dental schools have no power to control the acts of their students after they go out into practice. It often occurs that a student whose conduct in school has been exemplary, who has made a good record, disobeys every precept of ethics and morality he has been taught, after leaving school. Though the school may be thoroughly disgusted with such a result, it can do nothing but regret that it has not the power to make men honest.

Remember also that the dental school cannot make all of its graduates efficient practitioners, nor can any state board sift out all incompetent men, or men who may rapidly become incompetent through careless or immoral habits. A student may, under the influences thrown around him in school, do fair work both in his studies and in his operations, and after the last cramming for the state board examinations he may throw aside his books, fall into careless habits in operating, and within a few years become a thoroughly incompetent man. I have known such students to sell all of their books to the second-hand dealers the next week after passing these examinations. I wish to heaven they would sell their instruments also and seek other employment. The professional man has no right to be other than a continuous student. Therefore, until we can have laws by which the licenses of such men can be rescinded, we may expect some men will be dishonest and others careless, no matter how well the dental schools and the examining boards may do their work.

I appeal to you also to study the limitations of education that by your advice and good counsel this education may be kept within reasonable bounds; also that it may be made sufficiently rigorous to render the highest degree of service to the people possible, but with a watchfulness that the proper lines of limitation be not overstepped.

As professional men we should work together for the benefit of

all our people and so manage our dental education as to secure this end. If we work together with zeal and skill to that end, our profession will win high honors in the future.—*Dental Review.*

THE COMING REFORMATION IN THE PRACTICE OF DENTISTRY. By W. P. McElroy, M.D., D.D.S., Butler, Pa. I take pleasure in submitting for your consideration a paper entitled "The Coming Reformation in the Practice of Dentistry," a subject relative to our work, and about which the writer for a number of years has been more or less deeply concerned; and if my hearers will have the kindness to pardon personal mention, it seems I cannot better give you the keynote or a more fitting prelude to the trend of thought to be pursued than by relating to you an incident of my college career, which in itself signifies nothing of more importance than as before stated: Prof. C. N. Peirce, dean of the Pennsylvania Dental College, during one of his lectures on operative dentistry, remarked, "that occasionally a father or mother of the better and more intelligent part of the Philadelphia dentists' clientage, would call at the office with a son or daughter, and say, "Doctor, I am going to place this boy or girl's teeth in your care and keeping, and I desire you to see that no cavities make their appearance." To emphasize this fact he stated further, "that a prominent lady of the city, about six months previous, had brought to him her son, a lad of about 11 years, and made the above request; that he had carefully cleansed the teeth, had given the boy tooth-powder and brush, with instructions how to use them, and to return in three months. Before the expiration of this time, the mother returned with her son, and called attention to a new cavity she had discovered, taking the good old doctor to task, saying he had not given the teeth proper attention and care, or this would never have happened." As a student on the benches, I must confess I was rather startled and worried at this new phase of developments in the minds of the laity, and the new responsibilities which seemed to be attaching themselves to the profession, to which I was soon to become a candidate for admittance. Like thousands of others, I had conceived the idea that the dentist was to wait, at all times, till caries made its appearance and then resort to the usual mechanical interference to

arrest and hold such diseased conditions in abeyance. To me then the demand to prevent and oppose the outbreak of caries was not only unreasonable, but impractical, and since then, in scanning dental literature, I have been somewhat on the alert for matter written upon this subject, and feel safe in making the assertion that not one-half of one per cent of the matter read, touched upon, or in any way alluded to the prevention of disease proper of the dermal appendages. Suffice it to say, that the day has come when dentistry is considered, by intelligent, thoughtful people, as a branch of medical science, and the dentist a specialist at least, upon the dental organs. The march of general and specific medicine in more recent years has been preventive. Much energy and skill have been expended in this direction. Septic conditions, once so prevalent with the surgeon, are now the exception, as was strikingly exemplified in the wounded of the late Japanese army. Medical men are, and have been, able to cope with and stamp out epidemics of infectious diseases, by modern scientific methods of prevention, nowhere more beautifully demonstrated than in our own late scourge of typhoid fever at Butler, Pa., the spread of which would have been appalling had the medical men and those in authority been insensible to every aspect of the case save to dope each individual as he became prostrated. Even the scientific fruit-grower does not wait until the product of his trees and vines are injured by the insect, but he anticipates and sprays in advance, to prohibit the destructive forces of the enemy. Similar cases might be enumerated at length, where means and measures are adopted scientifically, with the same defensive purposes in view. But what has the dental profession done in the past, either directly or indirectly, to prevent the outbreak of disease in the dental organs? With but few exceptions, such attempts have been limited, feeble and inadequate.

No organized effort. Up to within a few months ago, the whole mass of the profession seems to have been lost, deaf, dumb and blind to all except the mechanical phase of the subject. Into this feature of the work they have entered with a spirit and zeal full of frenzy. Nevertheless, much credit must be given to those who are able to produce beautiful and apparently perfect artificial substitutes, in lieu of the missing portions of teeth that have perished by disease. We are often amazed, and marvel at the per-

fection of the product of some of the most skillful ones, yet nothing artificial ever came up to nature in its fullness. It surpasses anything ever contrived by the ingenuity of man. Perhaps some of the would-be "wonder-workers," in attempting to swallow this last statement, will experience some difficulty, not that they would disparage or willfully cast reflections upon the work of the Creator, but when it comes to their inimitable cobbling, and patchwork upon the teeth, they seem to wonder how the Almighty ever happened to overlook the process of their cunning and ingenuity when he created man. Ever since the beginning a truth has been staring the dental profession in the face, almost as true as twice two are four, namely: that the self-cleansing surfaces of the teeth are practically immune from decay. Now, if this be true, does it not seem reasonable, rational, and plausible, that the approximal and other surfaces would be just as immune if kept in like condition? Accumulations in inaccessible places about the teeth are allowed to remain undisturbed from week to week, from month to month, and from year to year. You know the rest; and is it any wonder that the molecular decalcification and decomposition of these organs take place when constantly receiving baptisms and renewed baptisms of oral acidity, the generally accepted cause of caries and erosions? The anatomy, the physiology, the pathology, the etiology and the chemistry relative to these organs are clearly understood, together with the impalpable forces, that are commonly present within their environment, and what we most need now is a new therapeutics, along the line of oral hygiene and prophylaxis, maintaining so far as possible oral alkalinity and a thoroughly aseptic condition of the mouth. We need some of the master minds to leap into the arena, to be followed by other strong men of the profession, to lead and demonstrate what can be done in the direction indicated. The whole history of our profession teems with examples to show what wonders may be accomplished by resolute perseverance and intelligent, patient toil. Thinkers and doers now and then arise, like stars above the horizon. Williams rose and thought, and his researches gave us the true cause of dental decay. Black labored zealously and thought, and he gave the profession modern cavity preparation. Jenkins investigated and thought, and we now have the porcelain inlay. Angle observed and thought, and to him, more than to anyone

else, is due the classification of malocclusion so familiar and helpful to orthodontists. The truth that these great minds have wrought out, and the blessings that accrue, will be handed down to the dental profession and to humanity for countless ages to come. What a host of witnesses have since appeared to testify to all they wrote and taught, eager to partake of "the crumbs that fall from their table," and so we must have thinkers and doers, if dentistry is destined to have a "new birth," and a new epoch added to its history. Already the subject has been taken up by such men as Dr. Edmond Rosenthal of Brussels, Belgium, who says: "All medical and social science tend to develop the means to prevent disease in all its forms. Hygiene is the law to which the civilized world will more and more willingly submit. Its domain is vast, and only partially explored and understood. Beautiful operations are a credit to those capable, but timely care and advice would not have necessitated their existence." He says further: "By popularizing the hygienic and prophylactic conditions of the oral cavity, greater beneficial results would follow for the community than by repairing avoidable damage." C. M. Wright, professor of physiology and pathology in the Ohio Dental College, says: "We have been so busy with actual disease, or disease which is apparent, that we have not given adequate attention to the potential cause of disease. This must engage our attention for the future. The coming dentist must operate upon sound teeth and prevent the outbreak of diseases lying dormant." He says, also, "When preventive medicine succeeds in reducing the percentage of death from typhoid, smallpox, diphtheria and tuberculosis, much can be accomplished by resorting to preventive measures in dentistry." Dr. D. D. Smith says: "By fortnightly or monthly polishing of every surface of the teeth, from 75 to 90 per cent of the dental caries can positively be prevented." The doctor does not classify the exceptions, but they will certainly be found among those of some peculiar idiosyncrasy or discrasia, and those suffering from long exhausting, debilitating diseases, such as Bright's disease, diabetes, tuberculosis and fevers, where the vital forces are depleted and the oral secretions morbidly perverted in consequence. Other exceptions will be found among the poor who have neither the time, the means, the inclination nor the

intelligence to properly care for the teeth. In fact, there is a woeful lack of intelligence among all classes concerning the possibilities of modern dentistry, as compared with general medicine and surgery. Why this is, we are unable to answer, unless, possibly, as a rule, dentists are too reticent. Every dentist owes it to his subject who is suffering from caries or any other condition that may be traced to ignorance primarily, to make clear the cause which led to it, that in the future he may guard against a repetition of the trouble. This is a duty incumbent upon the profession at every favorable opportunity, if the people be enlightened on what they should know to the best interests of their teeth and comfort. To ignorance may be traced most of the evils and suffering of the world, and the dental profession is responsible for that portion of it found in its field of labor, and when collectively they develop by reason and research into the light of truth and adjust the surroundings of the teeth harmoniously to nature's laws within them, under these conditions caries and the diseases incident to it will cease to be. This is the new birth, the new epoch dentistry is destined to have. This is the highest type, the loftiest ideal of dentistry of which we can conceive and the greatest gift the dental profession can hand down to civilization; and furthermore, it is no more wonderful, absurd or visionary, than the successful prevention of other diseased conditions that have directed the attention and fixed the scientific gaze of some of the ablest and most exalted minds of the medical fraternity. Any radical departure from time-honored customs and usages is often regarded with suspicion, and at times bitterly antagonized by those deeply concerned. These might be classified as pessimists, doubters, criticizers, the prophets of failure, victims of the fantasies of fear, credulous only of the losses of human exertion. Thanks for the optimists. They do not believe that an occasional failure constitutes a whole life-time of disaster. Ever hopeful, they are of those who conceive and create. The quartet of scientific dentists previously referred to in this paper were optimists and had they been pessimists, no beam of light from them would ever have crossed our darkened pathway. And so, we may rest assured, the optimists will lead "The Coming Reformation in the Practice of Dentistry." They will mold and give impulse and

direction to the tremendous energy that is to prevent, in a large degree, tooth dissolution, and incidentally the intense suffering, the dental post-mortems, the embalming and mummifying processes, the golden caskets, the wholesale extirpations, the empty oral tenements, refilled by porcelain gravestones to the prematurely departed. These conditions typify and symbolize the distress of generations that are gone, and they stand as a mournful prophecy to those that are to come. What grievous sorrow, distress and pain it has cost man to learn, that to violate a law of his own being is to bring upon himself sorrowful consequences. In the light of reason and the present status of our profession, a profession desirous of adding to its honor and efficiency before the world, do we not individually have some cherished convictions that these and other oral conditions so prevalent do not serve the ideal healthful interests and highest happiness of civilized man, but that, whatever has been, whatever is, "the best is yet to come."—*Dental Summary.*

RECREATION FOR THE DENTIST. By B. Holly Smith, M.D., D.D.S., Baltimore, Md. Webster gives as a definition of recreation, "The art of re-creating; the state of being re-created; refreshment of the strength and spirits after toil; amusement; diversion; sport."

Accepting this as my definition, I make no apology to your society for the selection of the topic of this paper. While I am willing to defer to those who advocate a strenuous devotion to duty on the part of members of our cult, I am here to contend that "strenuous devotion" to duty comprehends in a broad sense a devotion to the protection of these bodies and minds of ours, and the re-creation of the tired, worn and fagged remains into a joyous, courageous and wholesome body and spirit.

In order to approach the subject so that application of my contentions may be made to dentists, I make the statement that from my observation dentists are the hardest-worked professional men of whom I have any knowledge; that they work under more trying circumstances and for longer hours. A hard day at the chair will take more out of a man than will anything I know of; and yet the careful and successful practitioner must recognize

that in each successive operation the operator should feel and be at his best, or failure may result. Let us compare his work with that of some other specialists.

The oculist, or the throat and nose specialist, between the hours of 9 a. m. and 1 or possibly 2 p. m., sits in his chair making examinations, and wielding his spray, applicator, curette or knife. Possibly, after an hour for lunch, he may spend one or two hours in the afternoon at the hospital or infirmary. His patients follow each other in rapid succession, none of them staying longer than a few moments, and he charges a fee of from two to five dollars for each treatment. The gynecologist and the general surgeon operate for only a few hours of the day, and usually they are surrounded by an army of assistants and nurses, who aid them in their operations and assume entire charge of the patients. The general practitioner of medicine may have longer hours, but between calls he has the grateful outdoors, the relief from the monotony of one room, and he lives in an atmosphere of adulation; he is constantly made to feel that he and God are the great dispensers of healing and comfort. I do not deny that his heart is often wrung by the suffering of his patients, but in general he does what he can, and is possessed of an easy conscience and a serene mind. How is it with the dentist? The average city dentist operates from 8 or 9 o'clock a. m. to 5 or 6 p. m., with a brief half hour for lunch, and he does this six and (more's the shame!) sometimes seven days a week. He spends his entire working time in an atmosphere of tension; for say what you will about "painless dentistry"— about kind and gentle treatment—the average patient of to-day has not outgrown the dread commonly entertained yesterday of dental operations. The attitude of mind and body is seldom natural, and the practitioner is often sorely taxed to restore comparative composure, or an equilibrium which will allow the patient to submit to the tedious and difficult operation. This mental condition of the patient is no small factor in the wear and tear of a day's work, for who can deny that, if it were equally pleasant to patient and operator, great restfulness and delight might be gotten out of the successful accomplishment of an operation. The evolution of graceful and natural forms under the manipulation of our fingers, and the restoration to normal type of marred and faulty conditions in the oral cavity, are

more than interesting. The joy of recreation is a great and lasting joy, and it is in a measure a great source of stimulus and inspiration in the average day's work. Its accomplishment, however, is often made impossible by the nervous condition of the patient, and then the sorrow of not having done the best adds greatly to the weight of the care of the day.

Again, the dentist, however careful, cannot perform his daily task under the most salutary conditions. Do what he will as to ventilation, he is constantly inhaling the exhalations of his patients; he is often uncovering and liberating mephitic gases, or is inhaling breaths freighted with the products of suppuration and decomposition in catarrhal and other inflammations—not the least disagreeable of which is found in the mouths of pyorrheal patients.

It must be remembered that during all these long hours the dentist is standing in a strained and unnatural attitude, often on one foot, pedaling the engine with the other. He is constantly taxed by the necessity of focusing his sight and the effort of adapting his fingers to a small area. He spends his days in trying to keep his patient in just the right position; the mouth open just so much; the patient quiet; the tongue out of the way; the site of the operation free from moisture, etc. Is it any wonder that six or seven o'clock finds him "all in"—and, in some instances, trying to restore normal tone by resort to stimulants?

In observations extending over twenty-six years, I have found some of the brightest and best men of my acquaintance broken in health and periodically incapacitated for service; old and worn, and—as a classmate of mine recently expressed it to me in speaking of himself—with little or no heart for their work, and no capacity for the enjoyment of life. Sad as it may seem, we are forced to the conclusion that the working life of a dentist is of short duration. The medical practitioner is esteemed and respected even though the frost of age may have left its mark in his hair; he may totter on his feet and stumble in his speech, but his patients will yet love him and patronize him. Not so with the dentist; his efficiency impaired, he is quickly discarded. Aside from these considerations, the over-worked, the too-much-taxed practitioner is a prey to every ailment; he loses time because of illness, accomplishes his tasks with great difficulty—and who can

suppose he does them as well! He is often not really fit. No one is more exacting as to the fitness of his instruments and machinery, but many times he is indifferent to the demands of nature, and makes no conscientious effort to conserve his vital forces. In the last year I have known of a score or more active practitioners, about my age, who have completely gone to pieces because of overwork. In many of these instances these men were originally possessed of magnificent constitutions, country reared, and well equipped physically for life's battle; but being either ignorant or indifferent to their limitations, they forced themselves into a state of nervous collapse—a condition not quickly, if ever, recovered from.

With this rather gloomy picture I might readily be open to the charge of pessimism if I had no solution to offer, but I think I have. Most of us have conducted our practices along the lines adopted by those with whom we were associated when we began; or we are guided by the customs prevailing in the offices of our present professional associates. Again, the demands made upon us by our patients are shaped largely by what is commonly expected of the dental practitioner. He is supposed to have certain office hours because his brother dentists have. Did anyone ever hear of a patient who could not consult a throat specialist because his office hours lasted only until 1 p. m.? Yet how often it is made to appear that a dentist must wait even after his belated closing hour to suit the convenience of some unreasonable patient.

This is all wrong, and self-preservation demands that the dentist shorten his office hours. Let him begin at 8 a. m. and work until 2 p. m., for two or three afternoons in the week, and until 3 or 4 p. m. the other days. I have done this ever since I began the practice of dentistry, except that in the winter months I have worked for two afternoons until 4:45.

Again, I would advise against undertaking any major operations after half-past 1. The time after that can be well spent in plastic work, treatments and attention to orthodontia patients. It is perfectly easy to make this division or assortment of patients, and by so doing difficult operations are gotten out of the way before one begins to fag. They then are done at the time they can be well performed—when the operator is at his best. I flatly

say to my patients when I am requested to do a major operation in the afternoon, "I never do other than minor operations in the afternoon," and that settles it.

Now, I know as well as anyone that if by accepting this plan the income of the office is to be abridged, its proffer is worse than useless. The dentist is not sufficiently well paid, and it is largely his own fault. No other specialist but who charges for the simplest consultations, yet many dentists change treatments and adjust appliances without making any charge on their books. This is manifestly unfair. No one has any right to take five minutes of the dentist's time without paying him a fee. With one dollar as the minimum fee, the ten or a dozen stragglers and seekers of minor attention may be made to pay for the one or two hours wisely taken in the afternoon for recreation. And what shall this recreation be—or rather, how shall it be accomplished? By an hour or two at the club? A rubber or two at bridge whist, pitch, or pinochle, or bowling, billiards or pool? Attendance upon lectures on psychic research, philanthropy, surgery, medicine, municipal conditions? These are all useful, broadening and helpful, but are not recreation for the closing hours of the day. There may come a time for the indulgence in some or all of these, but my contention is that if the dentist will fit himself for his work he will then be fitted for these, occasionally. Therefore it should be his object, as it is to discharge his duty to his patients, to get *some* outdoors every day, and more most days. Let him make friends with the "friendly forest"—study it intelligently, know its members by name, and visit them often; watch the unfolding of their leaves in spring, and bask under their leafy shade in summer; feel a personal interest in individual trees, love them enough to embrace them, to get some part of their mysterious life, growth and helpful beauty; find out their secrets and the secrets of their companions. Van Dyke says:

"There are three vines that belong to the ancient forest. Elsewhere they will not grow, though the soil prepared for them be never so rich, the shade of the arbor built for them never so closely and cunningly woven. Their delicate, threadlike roots take no hold upon the earth tilled and troubled by the fingers of man. The fine sap that steals through their long, slender limbs pauses and fails when they are watered by human hands. Silently

the secret of their life retreats and shrinks away and hides itself. But in the woods, where falling leaves and crumbling tree-trunks and wilting ferns have been molded by Nature into a deep, brown humus, clean and fragrant—in the woods, where the sunlight filters green and golden through interlacing branches, and where pure moisture of distilling rains and melting snows is held in treasury by never-failing banks of moss—under the verdurous flood of the forest, like seaweeds under the ocean waves, these three little creeping vines put forth their hands with joy and spread over rock and hillock and twisted tree-root and moldering log, in cloaks and scarves and wreaths of tiny evergreen glossy leaves.

"One of them is adorned with white pearls sprinkled lightly over its robe of green. This is *snowberry,* and if you eat of it you will grow wise in the wisdom of flowers. You will know where to find the yellow violet, the wake-robin, and the pink lady-slipper, the scarlet sage and the fringed gentian. You will understand how the buds trust themselves to the spring in their unfolding, and how the blossoms trust themselves to the winter in their withering, and how the busy hands of Nature are ever weaving the beautiful garment of life out of the strands of death, and nothing is lost that yields itself to her quiet handling.

"Another of the vines of the forest is called *partridge-berry.* Rubies are hidden among its foliage, and if you eat of this fruit you will grow wise in the wisdom of birds. You will know where the oven bird secretes her nest, and where the woodcock dances in the air at night; the drumming-log of the ruffled grouse will be easy to find, and you will see the dark lodges of the evergreen thickets inhabited by hundreds of warblers. There will be no dead silence for you in the forest any longer, but you will hear sweet and delicate voices on every side—voices that you know and love; you will catch the keynote of the silver flute of the wood-thrush, and the silver harp of the veery, and the silver bells of the hermit; and something in your heart will answer to them all. In the frosty stillness of October nights you will see the airy tribes flitting across the moon, following the secret call that guides them southward. In the calm brightness of winter sunshine, filling sheltered copses with warmth and cheer, you will watch the lingering bluebirds, robins and song-sparrows playing at summer, while the chickadees and the juncos and the cross-

bills make merry in the wind-swept fields. In the lucent mornings of April you will hear your old friends coming home to you—phœbe, and oriole, and yellowthroat, and redwing, and tanager, and catbird. When they call to you and greet you, you will understand that Nature knows a secret for which man has never found a word—the secret that tells itself in song.

"The third of the forest vines is *wood-magic*. It bears neither flower nor fruit. Its leaves are hardly to be distinguished from the leaves of the other vines. Perhaps they are a little rounder than the snowberry's, a little more pointed than the partridge-berry's; sometimes you might mistake them for the one, sometimes for the other. No marks of warning have been written upon them. If you find them, it is your fortune; if you taste them, it is your fate.

"For as you browse your way through the forest, nipping here and there a rosy leaf of young wintergreen, a fragrant emerald tip of balsam fir, a twig of spicy birch, if by chance you pluck the leaves of the wood-magic and eat them, you will not know what you have done, but the enchantment of the tree-land will enter your heart, and the charm of the wildwood will flow through your veins.

"You will never get away from it. The sighing of the wind through the pine trees, and the laughter of the stream in its rapids, will sound through all your dreams. On beds of silken softness you will long for the sleep-song of whispering leaves above your head, and the smell of a couch of balsam boughs. At tables spread with dainty fare you will be hungry for the joy of the hunt, and for the angler's sylvan feast. In proud cities you will weary for the sight of a mountain trail; in great cathedrals you will think of the long, arching aisles of the woodland; and in the noisy solitude of crowded streets you will hone after the friendly forest. This is what will happen to you if you eat the leaves of that little vine, wood-magic."

Maybe the dentist will never taste of these beauties, and yet may have opportunity to indulge in some fad of raising roses, shrubs or trees. Then let him say with Whittier:

I know not how in other lands
The changing seasons come and go;
What splendor falls on Syrian sands,

What purple lights on Alpine snow!
Nor how the pomp of sunrise waits
On Venice at her water-gates;
A dream alone to me is Arno's vale,
And the Alhambra's halls are but a traveler's tale,
Yet he who wanders widest lifts
No more of Beauty's jealous veil
Than he who from his doorway sees
The miracle of flowers and trees.

To those who cannot have their plot of ground, and whose urban life denies a "sub," let me advise golf. Every city affords opportunity for membership in a golf course, and the game tends to a forgetfulness of all else. With his feet treading the soft, velvety grass; his eyes restfully contemplating the broad expanse of green sward; his arms and body engaged in the comfortable exercise and friendly competition of the game, and his lungs refreshed by the pure air of heaven, the fagged and weary man is made over. Two hours at this will set him up for the day to follow, and give him some appreciation of the benefits of sleep—"Nature's sweet restorer." And right here let me say that the man who knows he has a hard day's work before him has no business with late hours. As with the athlete, the dentist in preparing for his daily contest must keep training hours and remember the morrow when much is expected of him. Dr. Osler once said, in effect, that by the greetings of students at the breakfast table one could tell what time they went to bed the night before. The buoyant courage in the one offset by surly discontent in the other made it easy to distinguish the early from the late bird.

And then let us understand that this is not to be simply a physical recreation, for what body could be fresh and ready for toil with flagging and drooping spirit? The physical giant has been known to falter and fail because his heart was not in the task—his spirit was stale. Not so those who go to Nature for their refreshment and recreation. God has planted in the human heart a mighty interest in His wondrous works. Man's spirit, fretted into turmoil by the combat of the day, worn by futile effort, depressed by failure or limitations, finds rest and recreation in the contemplation of the broader and more generous scheme of

Nature, where the lark and the eagle, the lily and the rose, contribute alike to make up the grand concord.

How good is man's life—the mere living!—how fit to employ
All the heart and the soul and the senses forever in joy!
Let one more attest—
I have lived, seen God's hand through a lifetime;—all was for the best.

—*Dental Cosmos.*

DENTAL MEDICINES.—By A. E. Webster, M.D., D.D.S. The subject of dental medicine is too large a one to be taken up at a single meeting, so I shall attempt the discussion of only those parts of the subject which have been given special attention during the past few years.

An accurate knowledge of Anatomy, Histology, Physiology and Pathology generally reduces our faith in drugs, and increases our dependence in nature's efforts to restore diseased conditions to health. Surgical interference, so long as it assists nature to recovery, is of inestimable value, but as soon as it is contrary to what nature would do, it is baneful. Since dentistry is almost all surgical in character, it must of necessity have for its primary object the assisting of nature to recovery or to protect herself against disease. This is exemplified in the treatment of caries, the treatment of diseased pulps and associated parts and the treatment of pyorrhea alveolaris. We must admit that the treatment of diseases of the mucous membrane is strictly medical in character.

If the foregoing view of the work of the dentist be a correct one, all the medicines we use are those adapted to the treatment of surgical diseases or used in connection with surgery. On this basis let us consider the subject to-night.

The surgeon requires anesthetics both general and local, and the use of these drugs demands the use of their antidotes. Let us consider local anesthetics only. The dental surgeon's knowledge of anesthetics, and especially local anesthetics, should be as thorough as possible, because nearly all surgery is more or less painful.

Extraction under local anesthetics has practically reduced itself to refrigeration and hypodermic injection. Ethyl chlorid

spray and ether spray are two of the most useful drugs for refrigeration. Their application is simple and their efficacy marked in some cases. It is to be noted that especially in the use of ethyl chlorid spray, the vapors may be allowed to pass before the patient's nostrils, and thus produce a general anesthesia. The operator must be prepared for such a consequence and in fact take advantage of it. The marked results from local refrigeration from ethyl chlorid spray are more often due to the general effect than to the local.

Ethyl chlorid spray is useful in hyper-sensitive dentin and the devitalization of pulps. The most effective way to use cold on a sensitive cavity is first to begin with a continuous blast of cold air from a compressed air tank, and as sensation to this subsides, the spray may be directed upon the isolated tooth. If the cavity be deep or of great area, it should be filled with dry cotton before the spray is applied. Most sensitive labial and buccal cavities may be controlled by this means. There is always some danger of setting up such a congestion in the pulp that it may not recover. Ethyl chlorid spray on an anterior tooth where the pulp is partly dead and painful to touch will work wonders, or if the pulp is to be removed from a sound tooth ethyl chlorid will desensitize the dentin and the cocain pressure method may be used on the pulp when it is reached.

Cocain or some of its derivatives (or synthetic preparations eliminating the toxic elements) stands to-day as the only efficient local anesthetic for injection. Cocain stands at the head of the list in efficiency, but with this comes its pronounced toxicity. Many deaths have been recorded from the injection of cocain, and to overcome this objection eucain, stovain and novo cain have been substituted. These latter are much less efficient, but are from three to six times less toxic. Cocain has been used as high as ten per cent. for injection, but in recent years two per cent. is most commonly used. A recent means of reducing the toxicity of cocain and also increasing its efficiency with the same quantity of the drug is to add adrenalin chlorid. It is claimed that the adrenalin chlorid contracts the arterioles, and thus prevents the cocain from being rapidly carried into the general circulation. Besides, the duration of the anesthesia is prolonged. If three or four drops of a 1 in a 1,000 adrenalin chlorid solution be

added to 20 to 30 drops of a two per cent. solution of novo cain, the least toxic of these anesthetics, and injected into the tissues about the apex of a tooth or deeply into the interproximal space on each side, there will be such a profound effect on the pulp and dentin of the tooth that the dentin may be cut or the pulp removed without pain. This method of treating sensitive dentin is very satisfactory in trimming a tooth with a living pulp for the reception of a jacket crown. Personally, I have found great satisfaction where I thought the operation demanded the responsibilities of the injection. Cocain injected into the dentin of a tooth with a powerful syringe gives certain results both on the dentin and the pulp. It has been more recently shown by Tuller and Miller that the force required to produce local anesthesia of the dentin need not be so great as that produced from a syringe. Tuller of Chicago has been using for some time rubber cups, in which is placed the solution of cocain, and this placed over the tooth with the exposed dentin and pressed, thus confining the cocain and gradually forcing it into the dentin. He has been able to grind down teeth for crowns without pain. Miller recently suggested taking an impression of a sensitive cavity in compound, and then putting a solution of cocain into the cavity and over the impression place rubber dam and with this squeeze the cocain into the dentin. Cocain solutions pressed into exposed pulps bring about certain anesthesia. The method is well known to all, but there is a danger in its use, that has caused some anxiety to the operator and discomfort to the patient. If an excessive amount of the drug be forced into the tissues, gereral toxic effects may supervene, or local paralysis of the area of the distribution of the nerves. These local paralyses soon pass away, but there is such a profound intoxication of the tissues at the apex that they do not recover vitality, and the tooth becomes sore to touch, and may take weeks to recover. If the pulp is infected, as often occurs, or has a local pus formation on its horns, and cocain pressure is used, the pus may be forced through the apex and a severe pericementitis set up. It is better to use phenol as an anesthetic in all infected cases, either alone or with cocain.

Authorities seem to agree that it is impossible to know whether a given patient will bear cocain well or not. A patient who bears

cocain well to-day may succumb to it to-morrow. It has been noted that patients who have been worried, sleepless and hungry bear cocain but poorly. Some operators will not inject cocain unless the patient has his regular meals and has not been recently overwrought. Coffee given shortly before an injection is said to be of great advantage. Volusum is said to be a specific for the toxicity of cocain.

There are a few local anesthetics which are used in the relief of sensitive dentin which have recognized value. Among these are phenol, oil of cloves, campho-phenique, thymo-phyonique and thymol. These drugs relieve the pain in a tooth with recently exposed dentin much in the same way that linseed oil relieves the pain of a burn or an abraded skin. It protects the exposed nerve filaments from stimulation by the air or by cold. If many sensitive cavities appear in the same mouth their sensitivity may be much relieved by removing the loose decay and washing them out with a stream of tepid water and inserting a filling of equal parts of zinc oxid and thymol crystals, using as a liquid, zinc sulphate solution. This is one of the most satisfactory materials for holding dressing in cavities that we possess. Dr. Harold Clark suggests using the commercial zinc oxid and five drops of a saturated solution of boracic acid to the ounce to control the rapidity of setting. The zinc sulphate and oxid will set so rapidly that it is useless, but when boracic acid solution is added to the sulphate solution it may be gauged to set at any desired rapidity. This cement is clean, easy to handle, sets hard enough to last even weeks, has an antiseptic and non-irritating property, and is easily removed.

Phenol will relieve sensitive dentin in shallow cavities by heating it. If a pledget of cotton saturated with phenol is placed in the cavity and a large hot instrument placed against it several times, the tissue will be less sensitive to cut. The instrument should be hot enough to make the moist cotton sizzle. Not infrequently root canals are sensitive, even though the pulp be all dead and removed. This sensation comes from prolongation of nerves from the pericemental membrane to the pulp cavity. Many such sensitive root canals are sometimes found in the same patient. I have often mistaken the condition for remaining vitality of the pulp and applied more arsenic, only to find the sensitiveness remain-

ing, or complete destruction of the pericemental membrane. I have tried sulphuric acid, nitric acid, zinc chlorid with doubtful results, but have found success with one application of phenol after failure with other agents. In this connection it might not be out of place to discuss cauterants, which are used to destroy or digest remaining pulp tissues in a root canal. These agents can hardly be called anesthetics, but their discussion may come in satisfactorily just now.

During the past year the Odontological Club of Toronto conducted some experiments to illustrate as far as possible the relative efficacy of many of the agents used to digest pulp tissue. In two or three series of experiments beef fascia was stretched over a glass jar and the agents dropped upon the membrane, and the time compared that each took to penetrate the tissue. This same experiment was repeated, with the addition of gently rubbing the tissue with a smooth instrument. These experiments showed by both methods that sulphuric acid and nitric acid were the most penetrating. Glass tubes were packed tightly with beef, and an equal number of drops of phenol, sulphuric acid, nitric acid, zinc chlorid, silver nitrate, hydrochloric acid, formaldehyd and trikresol, caustic soda, caustic potash, potassium chromate dropped into each. After making many tests it was found that sulphuric acid and nitric acid were about equal, silver nitrate, hydrochloric acid, zinc chlorid, potassium chromate and phenol came in about the order mentioned. It would seem from our experiments that either sulphuric acid or nitric acid will most readily penetrate dead pulp tissue in a fine root canal. Other cauterants seem to either lose their penetrating power sooner or hinder their own permeation by a coagulum.

Another series of experiments was conducted to find out, if possible, what agents were the most effective in relieving sensitive necks of teeth. While this work was not completed, it would seem to indicate that those agents are most effcient which do not dissolve the tooth tissue. Among these are silver nitrate and strong solutions of formaldehyd. The alkalies were slow in action and the effect of short duration.

The dental surgeon is next interested in sterilizers, disinfectants and antiseptics. The intelligent use of these agents is based

on pathology and bacteriology; and on their therapeutic application and pharmacologic action.

The surgeon's first aim in undertaking an operation is to avoid bringing any new infection to the seat of the operation. With this in view, he must sterilize all appliances used in the field of operation—hands, clothing, instruments and appliances. The dentist finds that to do this he must have a somewhat uniform method for all, or there is a waste of time. Boiling the instruments is fairly certain, but there are appliances which cannot be boiled, hence, dependence must be put in some other form of sterilization. Solutions of drugs which will not poison or burn the tissues and have no odor, are the most suitable for this purpose. The drugs which fulfill all these requirements are too slow in action. The hands cannot be sterilized and kept so for any length of time, but they may be made fairly clean by a thorough washing and scrubbing with green soap and then bathed in alcohol or two per cent. solution of potassium permanganate. After making numerous experiments with most of the drugs for sterilization of instruments, we have found that a two to five per cent. solution of formaldehyd in water is the most certain and requires the shortest time. This solution will rust instruments very rapidly unless borax is added to it. An ounce to the pint of solution is sufficient. This solution will sterilize instruments in five minutes. Formaldehyd is an irritating drug, and must be wiped off the instruments before they are used. We found solutions of phenol, lysol and many others to be expensive and slow in action. Dr. Harlan last autumn brought forward the idea that instruments immersed in water contained in a copper pan would be sterilized. He gave what seemed to be a lame test for its efficacy. An instrument supposed to be infected with pus organisms was so sterilized, and then inserted into his assistant's hand without any untoward effects. Such a foundation is too weak to build any structure upon. Dr. Banzhaf of Milwaukee has shown Dr. Harlan's plan of sterilization to be entirely useless. The field of dental operations, when exposed through the rubber dam, may be sterilized with powerful drugs such as pure phenol, bichlorid, one in five hundred, five per cent formaldehyd.

The disinfection of infected or putrescent conditions in the mouth is a much more complicated process than the sterilization

of inert substances. The drugs which are the most efficient destroyers of life are generally the best disinfectants. This power to destroy micro-organic life will also destroy cell life in the human body. There was a time when the surgeon's only thought was to destroy micro-organisms by drugs, not realizing that they also destroyed the cellular elements of repair. Disinfectants are only useful so long as they assist nature to recovery. The dental profession has not yet passed through the stage of complete dependence in strong medicines, which are tissue destroyers; the lancet and the currette are of the same class. No surgeon would think of curretting an abscess cavity every day, and yet have we seen patients treated every day with strong drugs to cure an infected cavity. If an infected cavity is curretted or thoroughly cauterized once, the pressure anemia which hindered the pouring out of white cells and plastic exudate into the infected area is relieved and nature's method of repair can proceed, but if the cavity is cauterized again and again the new cells will be destroyed. Applying these facts to the treatment of the so-called blind abscess or the chronic abscess with a sinus, there should be at the first or second setting a thorough removal of the infected area about the abscess cavity. This may be done with the currette or cauterant. Generally speaking, all that is necessary for a successful treatment of a recently developed abscess with a sinus is to first wash through the tooth and sinus some cassia or peppermint water, followed with pure phenol. Seal the cavity in the tooth, and at a subsequent sitting the root may be filled. In those cases which have lasted some time and there is a possibility of there being dead bone present, this should be removed at once. The secret of success depends on a knowledge of the exact pathologic condition present, and the use of such drugs or measures as will correct those conditions at once and then assist nature with mild antiseptics, such as peppermint or cassia water, in which is placed salt. The more we know of pathology, the fewer drugs we need.

There has been a distinct advance made during the past few years in the treatment of putrescent conditions of root canals. It is impossible to enter fine root canals and thoroughly clean them. In consequence of this a drug must be selected which will penetrate fine canals without causing pressure, which might force the

contents through the end of the root and set up an acute infection or inflammation. The essential oils have been depended upon to do this, but their vapors often discolored a tooth, and were of slow disinfecting power. The drug which has supplanted the oils for such purposes is so irritating and causes such an acute inflammation when in contact with living structures that at first it was not taken up as readily as its merits demanded. To Dr. Buckley of Chicago is due the credit of introducing this drug, and so harnessing its irritating properties as to make it almost indispensable. The object is to have the gas of the formaldehyd given off but slowly. To do this it may be used in a crystalline form or mixed with zinc oxid. Cresol is added to the formaldehyd to increase its permanency and also to hinder its rapid giving off of the vapors. Equal parts of solutions of cresol and formaldehyd is the most useful combination. Knowing the characteristics of these drugs, it is clear that its chief place is treating infected canals, not as an application to the soft tissues unless an irritating cauterant is desired. Many dentists are using these drugs for every kind of treatment, and consequently making numerous lame teeth.

Another feature of dental medicine has been overdone. We have taught the public that decay of teeth is caused by microorganisms. Manufacturers, taking advantage of this statement, have made barrels of mouth washes, which they claim to be disinfectants or antiseptics. We know that the public are being taught to depend on these nostrums to prevent decay of teeth, instead of upon mechanical cleanliness. As this subject was before the society once before this year, I need say no more.

You have asked me to discuss dental medicines, and I fear I have shown the usefulness of but a few, and combated them as a whole.—*Dominion Dental Journal.*

ON THE PATHOLOGY OF PERICEMENTAL INFLAMMATION. By Julio Endelman, D.D.S., Philadelphia, Pa. Although pericemental inflammation, both acute and chronic, has been a favorite subject for study and investigation with a host of distinguished pathologists and clinicians, we are still confronted with the indisputable fact that certain phases of this problem remain as yet within the sphere of unexplained pathologic reactions.

Prior to the publication by Virchow of his epoch-making studies in cellular pathology, inquiry into the nature of the changes occurring in tissues consequent upon the action of abnormal or disease-producing influences was of necessity limited to a survey of the external or microscopical manifestations of the phenomena occurring within the individual cellular units. At the present time, and by virtue of the impetus given to the study of general pathology by this investigator and his students, we are able to follow step by step the changes which take place in cells and intercellular structures, and to more accurately interpret the external and internal manifestations of morbid processes. But this knowledge of cellular pathology would still constitute an insufficient means toward the ultimate solution of the problems with which the practitioner is daily confronted, were it not for the assistance, incalculable in value, which physiologic and pathologic chemistry —outgrowths of cellular pathology and bacteriology—have rendered, and which enable the student to accurately explain in many instances the complex and intricate nature of the chemical mutations constantly taking place within tissue cells, both in health and disease.

All changes which occur in tissue cells consequent upon the action of an irritant must be considered in the light of a vital reaction, the ultimate purpose of which is the re-establishment of function on the basis of the least stress upon the affected tissues and dependent structures. "Inflammation" is the classic generic term which since the time of Galen and his disciples has been in use to designate the chain of phenomena which constitute this cital reaction. As these inflammatory phenomena are the basis of all disease processes, a thorough knowledge of their nature and significance is an imperative requisite for a fair comprehension of all the remaining phases of the general pathologic problem.

As the subject of this communication is closely related to the fundamental problem of general pathology, it may not be amiss to review in this connection the changes which occur in the pericementum and the alveolar and gum tissues as the results of bacterial invasion; and in order to render this survey less complicated, I have taken the liberty to classify inflammations of the pericemental membrane as of two kinds, namely, endogenous and ectogenous—the *endogenous* variety being that in which the bac-

terial excitant has gained access to the pericemental tissues via the circulation, and the *ectogenous,* that in which the pericemental tissues have become involved by a process of continuity and through the agency of micro-organisms which, originating from outside of the body, have eventually become lodged in the pulp tissues and finally have migrated toward the pericementum.

The initial change in a case of typical inflammation is a dilatation of the capillary veins and arteries, occurring concomitantly with a marked slowing of the circulation. At this stage the leucocytes, which prior to the inception of this phenomenon were relatively few and scattered throughout the circulating fluids, are to be seen in considerable numbers clinging to the walls of the vessels, which, having become by this time markedly dilated, afford to the leucocytes a number of small portals of exit—the stomata of the endothelial coat of the capillaries. This migration of leucocytes into the perivascular spaces is preceded by the exudation of a fluid differing from the ordinary lymph exudate in that it contains a larger proportion of albumin. The liquid and solid exudate (large mononuclear and the polynuclear leucocytes) is traceable to an increased blood pressure—caused, in part at least, by the slowing of the blood current and by the dilatation of the capillaries—and to the motility of the leucocytes.

In addition to the foregoing phenomena, tissue proliferations leading to regeneration or hypertrophy occur throughout the progress of the inflammation. To recapitulate, we may state, first, that upon the occurrence of a degree of irritation strong enough to induce vascular changes, yet insufficient to at once destroy the vitality of the tissue, the reaction is hyperemia; second, that consequent upon the increased volume of blood there occurs an exudation of a lymph-like fluid and a migration of leucocytes through the vessel walls; third, that at this point, or perhaps at some later period, a proliferation of fixed tissue cells begins; fourth, that if the vascular alteration were slight, and the excitant of the inflammation acted only for a short time, restoration of function would follow; and fifth, that if the exciter of inflammation be so powerful as to successfully resist the bactericidal power of the tissues, instead of immediate restoration of function, and additional series of changes occurs, viz., death and liquefaction of the migrated

leucocytes and of some of the fixed tissue cells—in short, suppuration.

Although in the foregoing remarks the writer has endeavored to review serially the various phenomena occurring in the course of a typical inflammation, we should not lose sight of the important fact that while this pathologic narrative of inflammation greatly simplifies its comprehension, especially by the student, the probability is that clinically these phenomena do not take place seriatim or at definite periods. The exudate of inflammatory lymph may occur simultaneously with the proliferation of the fixed tissue cells; and again, the proliferation of the fixed tissue cells may precede the exudative period. In other words, the manifestations of an inflammatory process cannot be enumerated in arithmetical order; for here, as well as in the case of any other process in which the personal vital equation is the paramount factor, mathematical precision is out of the question.

A study of pericemental inflammation of bacterial origin involves a consideration of the following questions: (1) Pre-disposing causes. (2) Direct causes. (3) Immediate results—*i. e.* changes in the pericemental membrane and associated structures. (4) Remote consequences.

PREDISPOSING CAUSES.

The predisposing causes of pericemental infection of the endogenous type are all deleterious influences which, acting upon the pericemental tissues, induce nutritional disturbances, leading to the establishment of areas of diminished resistance at some point in the pericementum. In the case of teeth with living pulps, general nutritional disturbances of the hyperacid variety are potent predisposing causes, if such teeth be subject to a degree of continued stress above that which they are normally and functionally able to withstand—*i. e.*, malocclusion. In the case of teeth the pulp-contents of which have become devitalized and have undergone moist gangrene and putrefactive decomposition through the agency of saprophytic bacteria, a powerful predisposing cause is to be found in the products resulting from the gradual breaking down of the constituents of the pulp.

The chemistry of pulp-putrefaction was ingeniously worked out by the late H. H. Burchard (*vide* "Dental Pathology, Therapeutics and Pharmacology," page 384), on the correct assumption

that the changes which take place in nitrogenous tissue outside of the body as the result of the activity of saprophytic bacteria must of necessity be paralleled in the putrefaction of pulp tissue. Lately Dr. J. P. Buckley has again called attention to these changes (*vide* "Transactions of the Fourth International Dental Congress," vol. ii, p. 10) advocating a method of treatment which, according to clinical reports, is entitled to most serious and sympathetic consideration. The chemical end-products which are thus produced doubtless play the part of active irritants on the pericementum, especially on that part of the organ immediately surrounding the apical end of the root. Thus an area of diminished resistance is established, which becomes at once a favorable field for the development of the pyogenic cocci concerned in the production of the suppurative process.

In the endogenous variety of pericemental infection it is, of course, understood that there has been no solution of continuity of the hard tissues of the tooth-crown, and that the direct exciter of the infection has gained access to the pericementum either via the circulation or through the alveolus, the organisms traveling in the space between the alveolar wall and the root of the tooth through the structures described by Black as the glands of the pericementum, and which Malassez and others consider to be but the remnants of the epithelial enamel organ. Thus Black, in an article on the "Fibers and Glands of the Peridental Membrane" (*Dental Cosmos,* 1899, vol. xli, p. 101), states that—

"But little can now be said of the function of the network of glands of the pericemental membrane beyond what is indicated by their form, location and histological characters. With the knowledge of their position and general character, clinical observation leads to the conclusion that they are readily disturbed by certain drugs, notably by mercury and iodin; and that they are often disturbed by substances poisonous to them floating in the blood streams. This is evidenced by the appearance of marginal gingivitis, with soreness of the pericemental membranes. Such disturbances would not be likely to occur without the presence of some specialized or secretory tissue.

It seems to me very certain that the disease which I have described as phagodenic pericementitis has its seat in these glands. The location of the initial lesion and its progress to the formation

of deep pockets indicate that the beginning is in these glands, and that in its progress they are followed into the depths of the alveolus, the fibers and adjacent tissues suffering by reason of their proximity. It also seems to me that this disease is caused by some micro-organism not yet identified, which has a special tendency to this tissue as the bacillus of typhoid fever has a special tendency to Peyer's patches and the agminated glands of the small intestine. But neither of these propositions has yet been made out in a way to satisfy the demands of science. I have only clinical obcervations as yet on these points, and it is becoming almost a proverb that upon such subjects clinical observation unsupported by direct scientific physical research is extremely unreliable."

As moist gangrene of the pulp, with consequent albuminous decompositions, occurs in the absence of caries, and as in some cases infection of the pericementum follows, the theory that bacteria, saprophytic and pathogenic, invade the pulp and pericementum via the circulation, ceases in the light of these facts to be a theory, and becomes a fact. It is also admitted that bacteria may invade the pericementum via the gum margin, and it certainly is not impossible to conceive that in some cases of so-called pericemental abscess, micro-organisms have in this way gained an entrance into the tissues surrounding the root of the tooth.

The writer has elsewhere given his views concerning the etiology of pyorrhea alveolaris and pericemental abscess, two infectious disturbances of the pericementum identical from a strictly etiological standpoint. Pericemental abscess may be considered as a form of pyorrhea alveolaris, modified by the direction in which the pus discharges, and by the fact that in pyorrhea alveolaris the pericementum, owing to solution of continuity around the gum margin, is continually kept infected by micro-organisms from the oral fluids.

In a paper entitled "Uratic Deposits upon the Roots of Teeth," which it was my privilege to read before this association at a meeting held at Harveys Lake, Pa., May 27, 1905, I stated that in pyorrhea alveolaris of systemic origin the predisposing cause is very frequently a malocclusion so small as to defy detection. This leads to over-activity, excessive oxidation, decrease of alkalinity, and probably to the formation of lactic acid through the

breaking down of the complex proteid molecules of the pericemental membrane, and finally to the precipitation upon that area of the uratic salts held in solution in the blood by virtue of the alkalinity of the latter fluid. The deposited urates create a *locus minoris resistentiæ*, and, together with pyogenic germs, are responsible for the formation of pus. If the pus should encounter no resistance to its exit through the gum immediately overlaying the abscess, the condition will be a pericemental abscess, but should it discharge through the neck of the tooth, the condition will be one of pyorrhea. While the author would not attempt to include pyorrhea alveolaris in the scope of this paper, it is advisable to point out that the pathogenesis of the systemic form differs to a considerable extent from that of the simpler local form, in which the disturbance begins at the neck of the tooth, and by continuity causes the gradual destruction of the pericemental membrane and the exfoliation of the tooth.

In the ectogenous variety of pericemental infection the most important predisposing influence is the molecular dissolution of the hard tissues of the tooth through caries, and the consequent exposure of the pulp. If the latter organ should become the seat of bacterial activity (pyogenic cocci), there occurs within it a series of pathologic phenomena ending in gradual and progressive death and liquefaction of its cellular components, which process, if not arrested, will end in the involvement of the apical pericementum, with the production of what is designated as alveolo-dental abscess. The general nutritional state of the individual is likewise a factor not to be disregarded in the study of all types of pericemental infection. Well-nourished individuals—those in whom the continued breaking down of tissue for the liberation of the potential energy necessary to carry on the processes of life is fully compensated by the intake and assimilation of foodstuffs, and in whom the elimination of waste material is not unduly delayed—are in that ideal state of absolute health and vital defensiveness at which, theoretically at least, bacterial invasion would have less chance to occur and subsequently induce pathologic processes. Any influence which disturbs this ideal balance, and decreases the activity of the defensive elements of the body, must be considered as a predisposing cause of all types of inflammatory disturbances, including, of course, those localized in the perice-

mentum. The influences which may affect the nutritional balance would be all functional disturbances characterized by either insufficient or excessive oxidation, leading to the production of acid end-products in the former case and to alkaline in the latter. Also, all general pathologic states the result of bacterial activity in any of the vital organs are predisposing factors of the pathologic state now under consideration.

To recapitulate, we will state that the predisposing causes of *endogenous* pericemental inflammations are—(1) Deleterious influences responsible for the establishment of areas of diminished resistance in the pericementum, both in teeth with vital and in those with devitalized pulps. (2) Pulp-putrefaction following moist gangrene. (3) Local or general gingivitis, causing a recession of tissue around the gum margin (avenue of infection in some cases of pericemental abscess). (4) All such conditions as may lead to death of the pulp, such as large fillings, erosion cavities, the too violent use of polishing instruments, traumatisms, such as those occurring in the course of regulating operations, falls, etc.

The causes of *ectogenous* pericemental inflammation are —(1) Caries. (2) Involvement of the pulp tissue, suppuration, death and putrefaction. (3) Diminished local resistance.

DIRECT CAUSES.

The direct causes of pericemental infection are the bacteria immediately concerned in the inflammatory process, namely, the staphylococci pyogenes albus and aureus, the streptococcus pyogenes, and the diplococcus pneumoniæ. These different species of bacteria lead to the manifestation of different forms of inflammation. Thus the type of inflammation induced by the staphylococci is localized in character, while that induced by the streptococci is characterized by a tendency to spread, involving large areas of tissue. Again, in the inflammation in which the staphylococcus is the predominant exciter, abundant pyogenic discharge is almost invariably observed, while in that in which the streptococci are the major factor, pus is less abundant, the discharge being rather of the muco or sero-purulent type. The diplococcus pneumoniæ—a bacterium found in the majority of human mouths in a latent state—has also been found to be the most active organism concerned in the production of so-called pericemental abscess.

In a series of investigations by Dr. Emil Schreier, carried on in

the laboratories of Professor Weichselbaum (*Oester.-ungarische Vierteljahrsschrift für Zahnheilkunde,* April, 1893, and *Dental Cosmos,* August, 1893), with the view of determining the nature of the bacterial exciter in pericementitis, several important facts were brought out, particularly one in regard to the diplococcus pneumoniæ, which was found to be the most active exciter in almost all the cases of pericemental infection examined by him. From this discovery the author draws a conclusion which explains the influence of "catching cold" on the occurrence of pericemental infection, for if—as ascertained by him—the diplococcus pneumoniæ is the most active bacterial exciter in many cases of pericemental infection, then this bacterium in the presence of a diminished vital resistance should become equally active whether it be lodged in the pericementum or in the bronchial and pulmonary tissues.

Apart from its purely bacteriologic aspect, investigation into the nature of the invading organisms has consequently a significance which, and in view of clinical observations, cannot be too strongly emphasized.

CHANGES IN THE PERICEMENTAL MEMBRANE.

The pericementum having become invaded by bacteria, becomes at once the seat of a series of well-defined phenomena, nearly all of which give rise to special well-marked clinical symptoms. The cycle of inflammatory changes already described takes place in the substance of the membrane. The initial hyperemia, the exudation of the inflammatory lymph, and the proliferation of the pericemental fixed tissue cells are responsible for the production of that classical symptom of pericemental infection—namely, "elongation of the tooth." If at this period in the inflammatory process the defensive elements of the membrane be insufficiently powerful to dispose of the bacterial invaders in a radical way, death of the migrated leucocytes will occur, and the cellular structures around the focus of exudation and bacterial activity will gradually undergo a process of granular degeneration, and after being acted upon by the proteolytic ferment elaborated by the bacteria, will be liquefied. This gradual degeneration of tissue cells is bounded anteriorly by an area of inflamed cells, which upon liquefaction of the degenerated layer of cells likewise undergo

degeneration, and in that way the process continues as long as bacterial activity persists.

As the result of these tissue changes, which, of course, proceed in the direction of least resistance, the plate of alveolar bone becomes involved to the extent of becoming the seat of rarefying osteitis. After the continuity of the plate of bone is broken at any point, the gingival tissue becomes involved.

I desire at this point to call your attention to a statement frequently encountered in connection with the clinical description of dento-alveolar abscess—namely, that the pus perforates or finds its way through the alveolar plate. It should be borne in mind that pus in itself has no perforating or eroding properties, and that if the alveolar bone becomes perforated, it is as the result of a destructive inflammation in its own substance, and not—as might be supposed—as the physical or mechanical result of the action of pus.

The next tissue to become involved, as has just been stated, is the gum overlying the affected tooth and here the destructive inflammatory process repeats itself, the gradual degeneration and liquefaction of its cells resulting in the establishment of an open tract beginning at the focus of infection in the pericementum and ending in the external surface of the gum; in other words, a sinus has been established. Through this sinus the inflammatory products—in the form of inflammatory lymph, leucocytes in different stages of degeneration, degenerated fixed tissue cells, and the products of the liquefaction of leucocytes and fixed tissue cells —escape. If upon the evacuation of pus the focus of infection still remain uneradicated, the inflammatory process will continue, although with clinical manifestations far less severe than those preceding the discharge of the purulent inflammatory products and the condition known as a chronic dento-alveolar abscess with sinus will be established.

As the result of the discharge of pus there occurs a decrease in the intensity of the bacterial invasion through a diminution in the number of the bacterial invaders, and consequently a relative increase in the power of the tissues to counteract the morbid bacterial activity. The intensity of the inflammation is consequently decreased, and assumes a type characterized by slow progress, moderate intensity, and milder clinical symptoms. In this type of

chronic inflammation additional tissue changes occur immediately surrounding the initial focus of infection—namely, a more thorough and complete organization of the aggregation of embryonal connective tissue cells surrounding the focus of infection and the sinus.

This aggregation of embryonal connective tissue cells originates from the inflammatory lymph and constitutes the abscess sac, erroneously designated in years gone by as the "pyogenic membrane." The abscess sac in an acute abscess being but incompletely organized, adheres loosely to the root, and consequently, upon the extraction of the tooth, remains within the tissues—becoming, later on, the point of departure in the process of tissue regeneration. The organization of such a membrane or abscess wall limits the ravages of the inflammatory process around the root of a tooth and within the substance of its maxillary supports. Occasionally, the symptoms of a chronic abscess may assume a subacute character, this occurring principally during the course of acute infection of the respiratory passages ("colds"), and at periods in which the vitality of the subject is temporarily, yet markedly decreased. Upon the extraction of a tooth affected in this way, a bulbous swelling is noticed at some portion near the apical third of the root.

It should be noted, however, that all bulbous swellings attached to a tooth-root are not necessarily the outcome of chronic dento-alveolar abscess. Many such swellings or sacs are but pericemental or radicular cysts, not necessarily the outcome of pyogenic infection, and differ from the so-called abscess sacs in etiology and morbid anatomy. Thus a cyst may develop on the apex of a tooth consequent upon a degree of irritation of the pericementum such as might be induced by the pressure of a root-canal filling protruding beyond the apical foramen. In such an event the cystic sac and fluid are aseptic, and are but the outcome of a physical stimulus. The evolution of radicular dental cysts has been studied by such distinguished pathologists as Magitot (*Archives gén. de Médecine,* 1872-73), Aguilhon de Sarran (*Société de Biologie,* 1884), Broca (*Traites des Tumeurs,* vol. ii, 1869), Verneuil ("Kyste périostique du Maxillaire," *Progrès Médical,* 1874), Malassez (*Archives de Physiologie,* vol. i, 1885), Charcot ("Etude

clinique des Kystes périostiques" (*Archives gén. de Médecine*, 1881), Bounot, Albarran, and many others.

Two theories from among the many which have been advanced in the endeavor to explain the evolution of radicular cysts account in a fairly satisfactory degree for the anatomo-pathologic characteristics of these tumors. In order to more clearly appreciate the difference between an ordinary subpericemental abscess cavity—*i. e.* bulging of the pericementum—and a dentigerous cyst, let us state at once that a bulbous swelling simply the result of a sub or intra-pericemental abscess is composed exclusively of such cellular elements as enter into the formation of normal pericemental tissue; while the wall of a true dentigerous cyst, whether its development be due to a septic inflammatory process or to non-septic influences, is constituted internally of tissues other than those normally present in pericemental tissue—*i. e.*, epithelial cells, either of the squamous or stratified variety. The two plausible theories above referred to are the "epithelial débris" theory of Malassez, which has been investigated by Verneuil, Reclus and Albarran, and the periosteal theory of Magitot, modified by Broca. In Malassez' theory the epithelial lining of the cystic cavity develops from epithelial débris—the remnants of the enamel organ which persist even after the development of the tooth is completed, and are to be found in a latent state in the pericemental tissues. These epithelial cells, in the presence of a suitable degree of irritation, at once proliferate, forcing ahead of them the fibrous elements of the pericementum, resulting in the formation of a sac lined by connective tissue elements externally and epithelial cells internally. In the periosteal theory of Magitot, the internal epithelial lining of the cystic wall is unsatisfactorily accounted for, and consequently Malassez' explanation is the one most generally accepted at the present time.

Radicular cysts, if formed through physical non-septic agencies, may become infected, but the presence of a cyst on any portion of a root is not necessarily a sign of purulent inflammation, for, as has already been stated, it may develop in the absence of pyogenic cocci.

The variety of chronic alveolar abscess without an apparent sinus is erroneously designated as "blind abscess," for this term implies that no communication exists between the focus of infec-

tion and the mouth-cavity. But, as a matter of fact, such a communication invariably exists, it being in the majority of cases the unobstructed root-canal of the affected tooth or a path between the root and alveolar surfaces. That a chronic abscess has a root-canal as its sinus, or a sinus discharging at the neck of the tooth, does not necessarily imply that it reached the acute stage at some period during its existence. It might have been from its inception, of an indolent type, the question of acuteness and chronicity of dento-alveolar abscess depending on these two factors: first, the number and degree of virulence of the bacteria and second, the vital resistance of the tissues. Assuming that the crown of a tooth—let us say, an upper central incisor—is decayed; that following this decay and exposure of the pulp the latter organ underwent gradual dissolution through inflammation; that the infection spread to the pericementum; that the activity of the bacteria is moderate, and that the tissues of and around the pericementum are normally active, the result will be a slow and continued tissue destruction, with consequent discharge through what might be termed a natural and anatomical sinus.

The location of the affected tooth is an important factor in regard to the course, duration, and degree of tissue destruction in pericemental infection. If, for instance, the infection in the pericemental tissues around a lower tooth be of the indolent type, slow in its progress and moderate in its intensity, the pus will by virtue of the laws of gravity tend to follow a downward course, and will thereby cause more or less extensive tissue destruction, discharging eventually at some remote point. Burchard ("Dental Pathology, Therapeutics, and Pharmacology") states that "in some cases the pus may perforate the bone, and find passage along the submuscular tissue of the depressor muscles of the lip, opening above or under the point of the chin. The apices of the roots of teeth lying beneath the line of insertion of the mylo-hyoid muscle may cause an abscess to open in the neck."

The majority of submental sinuses are due to an infective process such as has just been described. Gires and Rodin (*Dental Cosmos,* July, 1901, page 734) report the case of a young woman twenty-nine years of age suffering from acute articular rheumatism and epileptiform hysteria. In the year 1891, during an epileptiform attack, the patient broke three upper incisors, but was not

conscious of having injured any other teeth. About the beginning of 1895 she had a severe attack of articular rheumatism, localized in the knees. On recovering, she experienced an itching sensation in the submental region. About a week afterward, decided inflammatory symptoms had developed under the chin, and after the application of a poultice—as advised by a druggist—a tumor of the hardness of a green apple developed, and invaded the symphysis. This submental sinus persisted until a right central incisor—containing a pulp which, having become strangulated by a traumatism received during the epileptiform attack eight years previously, had undergone putrefactive decomposition—had been suitably treated. The end-products of the breaking down of the pulp, acting as irritants upon the pericementum, had established in that organ an area of diminished resistance; and here eventually pyogenic bacteria, finding a suitable soil, induced the progressive destructive inflammation which ended in the formation of the submental sinus, and which lasted for over one year—namely, until the focus of infection in the tooth was completely removed.

REMOTE CONSEQUENCES.

Owing to the intimate relations of the teeth and soft tissues of the mouth with practically every organ of the body, it not infrequently happens that pericemental infections cause serious and at times fatal consequences. We have seen traced to this source disorders of the intestinal tract leading to pernicious anemia, and of the respiratory tract leading to purulent broncho-pneumonia. Septicemia and pyemia ending in death have also been caused by pericemental infections, as well as disturbances of the eye, ear, nose, throat, antrum; necrosis, partial and complete, of the lower jaw, facial paralysis, mandibular trismus, etc.

In order to emphasize as strongly as possible the degree of seriousness that may be assumed by the manifestations of pericemental inflammation, I will, with your permission, elucidate with clinical cases the varied nature of the complications under discussion. These cases are sufficiently reliable to be considered as an index of the conditions with which the practitioner may be confronted as the result of neglected cases of alveolo-dental abscess.

Let us at first consider the occasional effects of pericemental infection upon the osseous structure of the mandible. It may

cause a relatively small necrotic process, or one involving the entire alveolar process and causing the loss of all the teeth. In several cases the process has been so severe as to cause the loss of the entire jaw, and through exhaustion the death of the patient, to wit, the following case reported by John S. Marshall ("Injuries and Surgical Diseases of the Face, Mouth and Jaws"): Suppurative inflammation of the left third molar in a woman suffering from general debility caused an extended necrosis involving the entire jaw, which was finally lost from the articulation of the left side to the upper third of the ascending ramus of the right side. This case terminated fatally from exhaustion complicated with la grippe, sixteen days after the removal of the necrosed maxillary bone.

FACIAL AND SUBMENTAL SINUSES.

A rather frequent outcome of neglected pericemental infection is to be found in facial and submental sinuses, the more distressing because of the permanent disfigurement which they cause. The following cases are clinical observations of such instances:

(1) The patient, a strong, healthy-looking young man from Natal, had suffered for more than a year from constant purulent discharge from an opening below the angle of the jaw on the right side. The necrosed roots of the lower right first molar were removed, but did not eradicate the abscess. The second molar had a small cement filling, but was to all appearances healthy, as was also the third molar. Six months later the patient returned in the same condition and now consented to a further examination of the second molar, which was, however, still firm and free from tenderness on percussion. On drilling into the pulp-cavity pus escaped, the tooth was extracted, the sinus healed within a week, and a complete cure was effected. (*Cosmos,* November, 1884.)

(2) A little girl, aged eleven years, had an abscess originating from the inferior right first molar and extending into the tissues of the neck, accompanied with extensive swelling and tenderness, but with no acute pain. The swelling of the parts had followed an attack of severe pain in the tooth and jaw, from which she had suffered three weeks previously. For a week the jaws had been closed, and the only food taken each day was a little milk. The child had been confined to bed for a part of the time, and when presented for treatment looked decidedly ill. The tooth was

extracted under ether, and the pus-cavity found to extend downward three inches below the margin of the gum. Very little purulent matter followed the extraction of the tooth, but on injecting the pocket with hydrogen dioxid, large quantities were evacuated. The injections were continued once daily for six days, when the patient was pronounced cured, all discharge having ceased; the swelling had also nearly disappeared. (Dr. John S. Marshall, *Cosmos,* October, 1885.)

(3) Excessive swelling of the left side of the face extending downward to the clavicle; the fourth attack within a year. The surgeon who sent the patient had opened the buccal wall into a cyst, which discharged a teacupful of yellowish sanious fluid at intervals, gradually diminishing in quantity, until the symptoms subsided. A concealed root of the left first bicuspid was found, upon the removal of which a free opening with the engine revealed a sinus impacted with a cheesy deposit, which was broken up and the cavity washed with an antiseptic lotion, continuing the treatment daily for ten days when a complete cure was affected. (Dr. Porre, *Cosmos,* November, 1887.)

DISTURBANCES OF HEARING AND VISION.

In reviewing the literature of dento-alveolar abscess, the writer has found that disturbances of hearing and vision, and in some cases a complication of both, occur with greater frequency than might be supposed.

(4) Mr. J., aged twenty-three years. There was no nasal discharge, the orifice from the maxillary sinus being closed by inspissated mucus. He complained of great weight and pressure upon the affected side, severe otalgia, and deafness. The second bicuspid and the first molar were missing, leaving a large opening into the antrum. Considerable necrosed bone was removed, and the usual stimulating treatment pursued for about four weeks, when the discharge ceased and all other abnormal symptoms disappeared excepting the deafness. (Dr. Wm. Carr, *Cosmos,* August, 1889.)

(5) Mr. M., aged thirty-three, who had until two years before been in perfect health. He then noticed an offensive discharge from the right nostril, which usually disturbed him greatly upon retiring, causing violent coughing when lying on the left side. Also, upon rising in the morning he experienced nausea, which

continued until the nasal cavity had been entirely cleansed. He supposed he was suffering from catarrh, for which he sought and received treatment at intervals for twenty-one months, when the following additional symptoms were manifested: At intervals of three or four days he experienced attacks of vertigo, followed by severe otalgia and great tenderness of the teeth. For these symptoms he was treated for three months by his family physician, who finally advised him to consult me regarding what he supposed to be alveolar abscess. The right side of the face was then greatly swollen. Upon examination the full number of teeth were found, but the second bicuspid had been filled, and was pulpless. My diagnosis was not that of simple alveolar abscess, but suppuration of the antrum. The extraction of the second bicuspid was followed by a slight flow of pus. A further examination showed the alveolar process greatly necrosed, but there was no visible opening into the antrum. After an application of cocain all necrosed bone was removed, and an opening made into the antrum, when a great quantity of offensive matter escaped. The lining membrane of the antrum had thickened to at least ten times its normal thickness; this pathological condition I have found in all chronic cases upon which I have operated. Then, proceeding to syringe the sinus, I failed to establish an outlet through the opening into the nares. The sinus was first cleansed with salt water, then with potassium permanganate, after which the orifice was closed in the manner already described. The patient was then directed to use Dobell's solution, by means of a nasal spray, in order to remove any secretion from the nares. The following day the pledget of cotton was removed, when the discharge seemed greater than on the previous day. The opening through the meatus had then been established and the cavity was thoroughly syringed with warm water until all traces of pus disappeared. It was then cleansed with a stimulating solution, and the pledget renewed. This treatment was continued daily for three months, when the patient was dismissed cured. I have seen him at intervals since during the past three years, and there are no signs of recurrence of the disease. (Dr. Wm. Carr, *Cosmos,* August, 1889.)

(6) Patient suffered severe facial pains, involving the right eye, for relief of which he had sought the advice of an oculist,

who suspecting some obscure dental origin, referred him to Dr. Porre. The patient had previously suffered from loss of appetite, indigestion, and unaccountable mental depression and nervous prostration, for which sea air had been recommended without avail, and this was followed by a severe illness. An abscess was found, occupying the entire right half of the roof of the mouth, the cause of which was finally determined to be caries in the alveolus at the base of the upper right cuspid. The tooth itself presented no evidence of disease. A free opening was made, the sinus washed freely with an antiseptic lotion, and a drainage tube inserted, and in a short time the patient was turned over to his medical advisers. (Dr. Porre, *Cosmos,* November, 1887.)

(7) Young woman, of strenuous habits, complained of a dull aching pain under the orbit. Pain had lasted from three to four months, attended by gradual elevation of the orbital surface of the maxilla. The eye above this surface became so affected as to entirely lose its functions. After two or three months a discharge from the right nasal fossa of a thick, purulent fluid was perceived. This discharge persisted for eighteen months. An examination of the mouth at once revealed the cause of so much misery, and the removal of three roots, the seat of pericemental infection, was the simple means by which the nose and eye regained their functions. (Samuel Smith, F.R.C.S., *Dental News-Letter,* July, 1857.)

(8) Discharges from the ear, abscess formation in front of the ear, loss of hearing. The discharges continued for several months, with severe pain on moving the jaw or protruding the tongue, inability to close the eyelids or to contract the orbicularis palpebrarum. There was also contraction of the auditory meatus, and through the orifice, on pressure being made on the cheek, pus oozed out. Removal of "a molar" brought about immediate relief.

(9) Constant lacrymation of the left eye, complete deafness in the ear of the same side, neuralgic pains radiating through almost all the teeth and muscles of the anterior region of the head. The neuralgia and deafness were cured by extraction of the upper left third molar, which was the seat of pericemental infection. (Ed. Vautier, *Gaz. des Hôpitaux.*)

(10) Eye projected upon the cheek for four months. The orbital wall of the maxillary sinus had yielded, the sinus be-

came enlarged owing to the pressure of pus within, and the eye projected upon the cheek. (J. E. Garretson, *Cosmos,* October, 1870.)

DISTURBANCES SIMULATING NASAL CATARRH.

The discharge of an alveolar abscess into the maxillary sinus may set up in the nasal cavity disturbances simulating chronic nasal catarrh.

(11) Miss J., aged thirty, had considerable discharge from the right nostril, and had been treated for catarrh. The right side of her face was greatly swollen. Upon the affected side the second and third molars, the first bicuspid, and the cuspid were found in a healthy condition. The first molar and second bicuspid had been extracted for alveolar abscess three years previously. The swelling of the face had appeared twice before, when she had been treated for it by her family physician. On lancing, a free discharge of pus followed and an opening was found into the antrum. After the usual treatment for five weeks the discharge ceased, all the parts resumed their normal condition, and the opening into the antrum was allowed to close. I suppose this condition was caused by one or both of the teeth previously removed for alveolar abscess. (Dr. Wm. Carr, *Cosmos,* August, 1889.)

(12) Mrs. P., aged forty-five, who had been suffering for several years from intermittent fever, and had also been for some time troubled with a discharge of an offensive nature from the left naris—which had been diagnosed as catarrh—called to consult me about a first molar. Examination showed that all the teeth from the cuspid to the third molar had been removed except the first molar. This was badly decayed and loose, and upon pressure, pus oozed from the socket. The tooth was extracted, disclosing a cavity into the antrum corresponding to the roots of the teeth. The extraction was followed by a copious purulent discharge. There was considerable necrosis present. After treatment for over two months without any perceptible improvement, the patient left the city for the summer, and was under treatment while absent. At the expiration of four months she returned, still without improvement. Upon thorough examination a septum of bone about one-quarter of an inch in height was found rising from the floor of the antrum, dividing the cavity into two parts.

By means of a chisel the septum was removed and found to be of a cancerous nature. After this operation the case readily yielded to treatment, and recovery resulted. (Dr. Wm. Carr, *Cosmos,* August, 1889.)

Tomes (quoted by John S. Marshall) reports a case in which an abscessed upper lateral incisor discharged into the nose, the pus also dripping from behind the velum palati.

A case described by J. S. Marshall, *Dental Cosmos,* February, 1884: Discharge from left side of nose, accompanied by occasional soreness of upper left central incisor. The discharge continued for four months. He had been under treatment for three months for nasal catarrh. Proper treatment of the root relieved the condition permanently.

INVOLVEMENT OF THE TONSILS, PHARYNX AND LARYNX.

The inflammation due to pericemental infection may extend to the tonsils and the pharynx and larynx.

(13) A dentist's assistant had a tooth extracted which had been the seat of an abscess, without preliminary or post-operative treatment. Four days after the extraction the writer was called, and obtained the following history: The physical examination revealed a well-developed and vigorous young man with negative history. A swelling was discovered on the right side of the jaw. He complained of sore throat and chills and fever. Temperature 104 degrees, pulse 120. The tooth had been extracted four days previous to the writer's visit. A swab taken from the throat was examined, and revealed streptococci in abundance. The patient was desperately ill for two weeks; the convalescence was slow, but recovery was finally complete. Here again is a case in which, through lack of proper precautions, we have extension of the inflammation to the tonsils and vault of the pharynx. (Dr. D. J. Brown, *Cosmos,* February, 1906.)

(14) Patient had been treated for years for disease of the throat, involving at times the pharynx, larynx and fauces, causing serious local distress and general deterioration of the health. The throat disease disappeared and the patient's health rapidly improved under the simplest remedies after extracting several ulcerating teeth, particularly a third molar root, which was evidently the cause of the trouble. (Dr. Porre, *Cosmos,* November, 1887.)

INVOLVEMENT OF THE MAXILLARY SINUS.

The involvement of the maxillary sinus is perhaps one of the most common complications of pericemental infection—especially affecting the bicuspids and first molar in the upper teeth.

(15) During the past eight months, in addition to the cases in his own practice, Dr. Wm. Carr of New York has operated upon fourteen cases of diseased antrum for a throat and nose specialist. Of these cases, none resulted from chronic rhinitis, none from hypertropic rhinitis, one from dentigerous cyst, two from polypi and eleven from diseased teeth. This seems to clearly refute the argument of those who hold that suppuration of the antrum is generally due to causes other than diseased teeth. (*Cosmos,* August, 1889.)

The most serious systemic manifestations of pericemental infection are those caused by the absorption of toxins, the results of bacterial activity, *i. e.,* toxemia; of the ptomains resulting from the action of bacteria on animal tissues, *i. e.,* septicemia; and of the absorption into the blood of pyogenic organisms, *i. e.,* pyemia, which may become lodged in any area of the body and give rise to metastatic abscesses. The milder form of toxemia gives rise to chills, fever, headache, general malaise, etc., while the severe forms, as well as pyemia, may end in death.

(16) Patient aged sixty-four, health formerly excellent, but deteriorating, with marked symptoms of pyemia. Three or four years previous had an abscess over the upper left cuspid, which opened spontaneously, and afterward continued to discharge a sanious secretion. Local medical treatment for a year failed. Examination showed the maxilla from the lateral incisor to the second bicuspid to be involved in caries. Cure followed extraction of the teeth involved and the cutting away of the dead bone, employing sulfuric acid to secure granulation. The antiseptic lotion was used daily, and the reconstruction of bone was complete in thirty days. The health of the patient was speedily restored. (Dr. Porre, *Cosmos,* November, 1887.)

(17) Patient, aged sixty-four, had enjoyed the best of health until within four or five years. His physician, recognizing aggravated symptoms of pyemia, examined the mouth for the cause, as the result of which the patient was taken to Dr. Porre for the operation indicated. Seventeen teeth and roots were extracted,

and in ten days afterward the patient had gained six pounds in weight. (Dr. Porre, *Cosmos,* November, 1887.)

(18) Patient had a large cavity filled in the lower left second molar. The tooth became painful in a few days, and so continued with brief intervals for two years, at times involving the whole side of the face. Last November the pain became intensified, and the swelling increased until the left eye was involved, followed by symptoms of paralysis, which, in spite of the best medical attention, finally involved the entire side of the face, then the pain suddenly subsided. The patient experienced the usual functional derangements pathognomic of pyemia. On account of the enfeebled condition of the patient when referred to the writer, the tooth was not extracted, but the filling was removed, when a liberal exudation of no uncertain odor followed. The tooth was thoroughly syringed with warm water, dressed with an antiseptic lotion, and the patient was dismissed. The improvement in three days was astonishing, and still continued, the promise being that the tooth would be saved, the paralysis dissipated, and complete restoration to health accomplished. (Dr. Porre, *Cosmos,* November, 1887.)

(19) General prostration, with traumatic lesion of the tongue. Patient's condition was of a low typhoid character. Under tonic treatment he would react for a time, and then relapse. The teeth were found covered with tartar, the gums ulcerating; two teeth were ulcered and discharging septic fluid; one of them, which inclined inward and had been worn to a sharp edge, continually cut into the tongue, thus actually distributing the virus by inoculation. The ulcered teeth were extracted, an antiseptic lotion applied, and the patient's medical attendant reported him in better health than for years. (Dr. Porre, *Cosmos,* November, 1887.)

(20) Margaret H., aged twenty-three, a domestic. Family history negative, as also the patient's. She had always enjoyed good health and had a vigorous constitution. Six months previous an abscess developed upon a tooth; there was quite pronounced swelling, also chills and fever. The tooth was extracted without preliminary precautions, and no after-treatment suggested. Two days after extraction she felt a line of tenderness extending from the right side of the jaw, down the neck, chest and abdomen to the anterior superior spine of the ilium, then extending across to the left side and upward to the left rib, and posteriorly into

the left lumbar region. At first there was epigastric discomfort, for which she consulted a physician, and was treated for indigestion, without any benefit.

The patient presented herself for examination April 21, 1905. Physical examination: Patient well developed and perfectly nourished. The heart, lungs and abdominal organs were found normal. There was a slight swelling in the right groin, with some sense of fluctuation without redness or tenderness. For the past week, on walking, the pain in the right groin had persisted, but was never severe. The urine was negative. Diagnosis: Either intra or extra peritoneal abscess. An operation was advised, to which the patient readily consented. It was performed April 23, under morphin-atropin-ether anesthesia. An inch incision was made, and the appendix vermiformis was exposed; as it was found normal it was returned to the abdomen, and the parts were closed very carefully. A second incision was made close to a parallel with Poupart's ligament. An extra-peritoneal abscess was found, opened, and drained of a large quantity of creamy pus. The cavity was washed out, and packed with iodoform gauze, and the dressings repeated every day until recovery, which was prompt.

On August 23 the patient again presented herself for examination. The hamstring muscles of the left leg were contracted so that the leg was partially flexed. Pain was present, and the patient walked with difficulty. Physical examination: The pupils were equal and reacted well. The mucous membranes were rather pale; no enlarged glands could be detected in the chest, and the heart, lungs and liver were normal. The kidneys and spleen were not palpable. Evidently an extra-peritoneal abscess was forming in the left iliac fossa. There was pain in the region of the left kidney, evidently due to a lumbar abscess. Under cocain the tissues were incised down to the left kidney, and a small amount of pus evacuated. From this a pure culture of the staphylococcus albus was obtained, and four days later, under nitrous-oxid-ether anesthesia, an incision was made on the left side above Poupart's ligament, the abscess cavity was opened, and a large amount of pus evacuated. The urine also at this time showed the presence of pus. For a while it seemed as if the patient would recover, but shortly after evidences of a general toxemia developed, and after a few weeks she died of general septicemia.

Here is a case clearly demonstrating secondary infection through the lymphatics from the primary seat—the oral cavity—in which a young and vigorous woman lost her life from lack of preliminary and post-operative treatment for the removal of a tooth the seat of an abscess. (Dr. D. J. Brown, *Cosmos*, February, 1906.)

(21) A boy aged four presented at the time of his admission to the Hôspital des Enfantes Malades, severe symptoms of infectious nature. The right peri-auricular parotid and angulo-maxillary regions were tumefied and edematous. There was a discharge through the external auditory meatus of some serous, turbid liquid. The diagnosis of septic complications of auricular origin was rejected by Professor Broca, for the reason that while the post-auricular region was of normal appearance and absolutely painless, the area over the body and ascending ramus was extremely painful to pressure. The diagnosis was consequently changed to osteomyelitis of the jaw.

The interior of the mouth could not be examined, owing to a forced contraction of the masseter and internal pterygoid, caused by the inflammation around the ascending ramus; but the examination of the vestibule alone at once pointed to the cause of the disturbance. From around the gingival margin of the lower right molar pus was being discharged in large quantities. The patient's temperature was about 105 degrees, the pulse small and rapid, and the color of the skin grayish. The urine contained great quantities of albumin.

The surgical intervention consisted in the immediate extraction of the teeth which were the seat and origin of the pyogenic invasion. On the following day, with the patient properly anesthetized, a deep incision was made along the lower border of the mandible. From under the periosteum about two drams were removed of a brownish, fetid and hematic discharge. The operation improved the local condition, but did not remove in the least the systemic symptoms. The temperature went down about two degrees during the next day, but went up again to about 105 degrees, and on the third day the little patient expired. (Professor Broca, *Cosmos*, July, 1905.)

In the discussion of the remote consequences of pericemental infection, the writer's purpose has been simply to call attention, with the assistance of clinical observations, to the necessity of

viewing pericemental infection in the light of the serious disturbance which it really is, and not mainly as a purely local disorder. Allusion has been made to only a few of such complications, because the magnitude of the subject would preclude its extensive discussion in a paper the original purpose of which was to review systematically the phenomena of inflammation of bacterial origin in the pericemental membrane.—*Dental Cosmos.*

CARE OF THE TEETH A PROPHYLACTIC TO DIGESTIVE TROUBLES. By G. S. Junkerman, A. M., M. D., D. D. S. The chief function of the teeth in animal life is the comminuting of food, which function indirectly becomes a principle of prophylaxis to digestive diseases. Such function is determinate in man, but not so in all animal life. Some of the lower animals use the teeth for prehension of food with an additional function of organs of defense and offense, in the former of which function they are a prophylactic in that starvation would ensue if the animal were deprived of its teeth. Example of this occurs in the snake, which does not comminute with the teeth, but prehends its food and swallows it whole, leaving the digestive juices to dissolve it. We find also in the ascent of the scale of animal life that the number of functions increases, and in man the teeth have a manifold of functions, namely, prehension, comminution, speech, and aid in the acquirement of some of the arts. The teeth of man are to him the same as the mortar and pestle is to the chemist wherein comminution occurs, that the solvent in the test tube may be brought more intimately in connection with the substance to be dissolved. Those who suffer from digestive troubles are advised to eat slowly. Such advice is not always conducive to the best results. The masticative power of the human jaws is not equal in all subjects. The variation is greater than might be apparent upon a superficial observation. A fast eater does not necessarily have insufficient food mastication nor does he necessarily swallow his food whole as is generally supposed. For the same reason the slow eater is not always the best masticator. To make deductions correctly the force of mastication must be determined in each case. This power is determined by observing the size of the jaws, the strength of the muscles thereto attached, and more particularly the size of the teeth in each case. When these three features are the

largest it may be said that the power of mastication is at its maximum. The number of teeth present and the striking relation of the two opposing jaws can not be omitted in our calculations of the masticatory powers. Popular fallacies are the results of conclusion jumpers, who, seeing only the tail of the animal, determine it to be a large rat or a small elephant, as the case maybe. Gladstone, who was supposed to have chewed each mouthful of food thirty times, was not necessarily a good masticator. Perfect mastication and slow eating are by no means synonymous terms. While the one is necessary to perfect digestion the other is sometimes the cause of insufficient food absorption. One who eats slowly is subject to having his appetite appeased before he has taken sufficient food into his stomach to supply the requisite demands for the proper nourishment of his body. Every one has experienced the loss of appetite for meals when he has eaten a little just before meals. In just such a manner in slow eaters with perfect mastication the appetite becomes satisfied before sufficient food has been taken. From these facts we can safely deduce the conclusions that fast eating and proper mastication may become twins, and that slow eating and improper masticatations may bear the same relationship to each other. Also that perfect mastication does not depend upon time but upon quality of the masticatory powers. Those who masticate properly do not require as much food as poor masticators, because in the latter case the stomach passes to the small intestine that part of the food which has not been properly prepared for its digestion. Just as slow eaters are liable to take insufficient food, so fast eaters, even though good masticators, are liable to overload the stomach. Both conditions are prone to produce digestive troubles. Good teeth then are only partially prophylactic to digestive diseases, but good mastication, joined with proper quantity and quality of food, is entirely so.

Let us now consider what effect bad teeth and numerical deficiency of them will produce upon the digestive organs. Much stress has been placed by authorities upon the insalivation of food, but I do not believe that this subject is worthy of much consideration, since it seems very apparent that the saliva is rather a lubricant than a digestive fluid. It is a subject of adverse criticism to the medical profession that the patient is not more often asked to *open his mouth* instead of to *stick out his tongue.* The reason that

such a condition exists is easily explained in that the teeth are organs that can be removed or substituted with only remote danger to life, while all other organs of the body must be repaired or restored to prevent immediate grave complications. The average practitioner commits the error so common to unsuccessful people, that of not heeding the smaller things pertaining to their occupations. All functional activity should be maintained at its normal height and the functions of the teeth can not be overlooked by the physician who wishes to serve his patients properly and scientifically. You can not determine an orderly house by looking into its vestibule or an orderly mouth by observing the teeth visible in a smile. Numerical weakness of the teeth should remand the patient at once for inspection to the proper specialist. A mouthful of diseased and disintegrated teeth is a constant menace to the digestive organs, and particularly to the stomach, which is the receptacle for the acrid and decomposed effluvia of such a condition. There is no better channel than the mouth nor more favorable incubator than a mass of decaying teeth for poisoning the digestive tract.

If inconsistency were a jewel the application of the family physician's therapy to the oral cavity would be a sparkling diadem, beset with such a variety of precious stones as to exhaust nature's supply. If one compares his experiences in passing through a monkey house and a crowded street car the olfactory evidence of man's evolution is too convincing to be denied, even by the most prejudiced observer. The crowded street cars might not be so offensive to us as the monkey house, but placed in a like position is it not possible that the monkeys might have a different story to tell? The hygiene of the monkey house, however, is carefully looked after by the man who would have to buy new monkeys if the old ones should be accidentally suffocated. In this age of sterilization I do not believe, like our worthy chief editor, that there is too much of it, but that it is wrongly applied. Sterilization of the vaginal cavity seems to have the call of the day and were statistics obtainable it would be found that a large percentage of sterilization is applied to that cavity with not a small per cent to the urethral cavity. The mouth which plays such a large role in the hygiene of the body and still a much larger role in society, where is so often observed a preponderance of varied and offensive breaths, seems to be continuously overlooked by the

physician. The oral cavity is a continuously active chemical laboratory where the varied substances introduced into the mouth are ever likely to be churned into varied compounds.

Those who possess the mouths of fetid odor are seldom sick enough to consult the physician, while those who have to inhale them frequently become so. Physicians who seem always busy saving human life are often grossly neglectful of human comfort. This becomes most apparent when a roomful of company can be rendered uncomfortable by the exhalations of one neglected oral cavity. Foul breaths do not in most cases come from disordered stomachs but from unsterilized mouths and fauces. The gastric troubles are rather coincidental with this condition of which they are the direct consequences. It is largely a disease capable of treatment and cure. It often arises from faulty anatomical construction. Not only caries of the teeth, but the defective manner of their position in the arches forming receptacles for lodgement and subsequent decomposition of food is responsible for the disease. Characteristic construction of the tonsils where deep rugæ exist is most prolific in producing foul breath on account of the lodgement of detritus in these convenient nests. In a large percentage of cases the foul breath which is a public nuisance comes from the decayed and neglected condition of the teeth. Simple means may be resorted to in alleviating the condition arising from this source. The mouth and throat should be frequently washed and rinsed with one of the various antiseptic washes now so effectively and beautifully prepared and easy of acquisition. The physician could do much along the line of correcting the foul breath evil if only he thought it of enough importance to do so by calling attention to it where the dental surgeon does not come in contact with the patient under this distressing condition. This is only one phase of oral hygiene, but treatment deserves consideration as a prophylactic to digestive troubles.

Gastric and intestinal troubles arising from faulty teeth are exemplified in the dumb domestic animals of man. Ulcerating or decayed teeth will cause the animal to stop eating even to the starving point. Children often refuse food from the same cause without any complaint having been directed to that locality. Even should there be complaint the situation is met by the thought that

the child has to lose its deciduous teeth until the matter grows more grave in some digestive manifestation.

In the treatment of all digestive diseases have the patient open the front door of his digestive tract, walk in and take a look around in the parlor, you may be able to transact all your business there without having to meddle in the kitchen or even open the back door. —*The International Journal of Therapy.*

ALVEOLAR INFECTIONS: EXTRACTION VS. RETENTION. By Geo. B. Mitchell, D.D.S., Buffalo, N. Y. There has developed during the past few years, not alone in the progressive dental profession, but also in the medical profession, the concept that the oral cavity, instead of maintaining a secondary and inferior position, relative to health and disease, stands pre-eminent as one of the prime factors in the maintenance of health or in the causation of disease.

The field of oral sepsis and oral prophylaxis has developed with remarkable rapidity within the past few years, and bids fair to have a more permanent and serious significance to us, as stomatologists, than any other branch of our art.

There are present to-day—as of old—in the adult mouth the same, if not more of such factors as lead to oral infections and oral disease, of whose malignancy there is no question, and which until recently were not only overlooked, but also entirely ignored. One instance is the familiar saying: "Bad stomach causes bad teeth," and to-day we know that the reverse is only too true. The light of more radical and scientific reasoning has dawned upon us, bringing with it the more permanent results in physical prophylaxis and sanitation with which we are more or less familiar.

The profession as a whole has worked prosthesis—the mechanical aspect of dentistry—to a standstill, neglecting its surgical and medical side; with the result to us as dentists that the pathogenesis of systemic disorders, such as dyspepsia, chronic indigestion, diabetes, septicemia, etc., has borne apparently no relation—until lately—to the teeth and adnexa of the oral cavity.

To-day one of the necessary qualifications of the dentist is that he should be familiar with the modes, manners and ways of pyogenic and other organisms in their relation to the internal organs, inasmuch as clinical bacteriology has demonstrated that practically every part of the body may be affected, and many diseases of the

body are caused by germs which are to be found in the oral cavity in a latent state.

"We must not lose sight of the fact," says Dr. Monnet, "that the mouth is a 'microbic receptacle,' holding microbes from the air, Koch bacilli, pneumococci, staphylococci, sarcinæ, and the special micro-organisms of the mouth—lepthothrix buccalis, bacterium termo—and all those salivary micrococci and bacteria which produce septicemia when injected in the rabbit, as shown by Pasteur."

Netter, by his experiments, found that in ten per cent of all individuals examined at random the saliva contained the staphylococci pyogenes aureus and albus, and that the pneumococcus was present in fifteen to twenty per cent of the mouths of healthy persons.

It is generally accepted knowledge that oral sepsis is a contributing cause in numerous cases of tonsilitis and influenza—the bacillus of influenza having its breeding-place in the septic mouth.

THE QUESTION OF TOOTH-EXTRACTION DURING INFLAMMATORY CONDITIONS.

It has been the experience of the writer, as well as that of others, to hear a *confrère* remark that he would not extract a tooth during an attack of incipient pericementitis—while the battle was being fought between the leucocytes and the invading bacteria, and before infiltration of the soft tissues had begun. One wonders at the reason for not extracting. The worthy *confrère*, upon being asked, answers, "Dangerous." "But why dangerous?" you ask, and the reply will be either an indefinite one or a French hunch.

Other *confrères* will tell you or the young practitioner that they never hesitate to extract a tooth at any stage of alveolar infection or inflammation. In the face of so much uncertainty, what should one do and believe? The author knows a score of cases where the attending dentist, and even the physician, refused to extract, and yet when asked for reasons could offer no logical ones.

Such diversity of opinion on this matter and such indecisions as to procedure was precipitated upon a meeting of the Buffalo City Dental Association last winter, and the writer then and there de-

termined to find out, if at all possible, what, if any, danger (and why) could accompany the extraction of teeth the seat of abscesses. The opinions expressed by various authors and journals and the replies to letters written to certain members of high standing in the dental profession constitute, in a general sense, the present paper.

Attention was called to the former stand of non-extraction assumed by Dr. Robt. T. Morris, professor of surgery in the New York Post-Graduate Medical School, who in a recent article entitled "Infection of the Lymph-glands of the Mouth and Throat" (*Dental Cosmos,* June, 1904), says:

One class of infections, very dangerous ones, have been frequently overlooked by dentists. . . . These are infections following the removal of abscessed teeth. Patients die and the cases are not reported; they come in [into the hospital] to be treated for pneumonia. There are patients dying this minute in this city from the result of having abscessed teeth extracted while in the course of acute infection; there are cases dying continually . . . not recorded and not discussed, for the reason that they are entered at our hospitals as cases of pneumonia; but they are cases of septic pneumonia, embolic pneumonia, resulting from infection from abscessed teeth. Very often the dentist knows nothing about it. He removes a tooth; he hears, four or five days later, that the patient has developed pneumonia—believes it to have been a coincidence, thinks his part in the case is not one of consequence, and the patient dies. The case is recorded as a death from pneumonia—not as septic pneumonia from an abscessed tooth.

Let us glance into the oral cavity, and in a general, not microscopical, way make a bacteriologic investigation.

REFERENCES IN DENTAL LITERATURE.

The writer finds that dental literature is sadly lacking in reports on cases of infection and death due to extraction, but this deficiency may in no way indicate that such conditions have not occurred, or do not occur at the present time. More nearly is this due to our shortsightedness in matters pertaining to pathogenesis.

According to Vignal and Suckdorf, an adult man passes from thirty to fifty billion of bacteria daily in the feces. Many are

harmless in the healthy individual, but, as will later be shown, their virulence is felt after accidents and injuries, such as gunshot wounds, injuries in extraction, shock, catarrhal conditions of the mucous membrane, etc. One is in constant danger of being infected. It has been scientifically demonstrated that every pathologic lesion in the oral cavity is due to the attacks of micro-organisms. Our resistance to these micro-organisms depends on the resistance of the tissues to pathologic influences, and varies in direct ratio to the degree of health of the individual. The healthier the subject, the greater the resistance of the tissues to invasion, and *vice versa.* Good health is a product of great resistance to microbic invasion.

Goadby says: "It seems not improbable that the various pathogenic bacteria which are to-day associated with disease were at one time simple saprophytes, as we know them to-day, and may yet attain pathogenic powers. Not to admit such a development of pathologic power entails the obsession that pathogenic bacteria were created by design to destroy human life, and moreover, such a refusal places us at a variance with the monistic conception of the universe and the orderly operation of the laws of evolution with which all observed phenomena accord.

Vicentini's suggestion that the pathogenic qualities of bacteria are probably acquired, and not necessarily permanent, is shown under the ordinary condition in an epidermis, in the oral cavity, and in the intestines, where many virulent bacteria are present without causing any harm. But give them the suitable conditions for growth—shock, injury, diminished resistance of tissue—such as we find localized in abscessed teeth, and they become disease-producing.

Many undoubtedly remember Dr. Miller's surprising statement of a year or so ago, when he said that the bite of a girl was as deadly as the sting of a venomous serpent. Young men, beware!

Kirk, (*Dental Cosmos,* November, 1900) shows a culture of the diplococcus of pneumonia, from Miller's specimens, which was found in the blood of a mouse which had been inoculated with a culture from the saliva, thus showing that the blood-stream is a carrying agent for pathogenic organisms. They are undoubtedly harmless until they reach some point of diminished resistance, and there set up inflammation. This point of diminished resistance

in our case is the diseased tooth, and the shock or injury of extraction throws the diplococcus into a state of activity.

Farther on, Kirk shows a section of an experimental abscess in the kidney of a rabbit that had been infected by a pure culture of staphylococcus pyogenes aureus, one of the pus-producing micro-organisms found in pericemental abscess. The culture was injected into the ear-vein of the rabbit, and established by a metastasis an abscess in the kidney.

In four cases where he secured specimens of the pus from pericemental abscess, the bacteriologic investigation showed in each the presence of the diplococcus pneumoniæ. A rabbit inoculated with the pure culture of this diplococcus died in ten days, with all the symptoms of the peculiar form of toxemia which is produced by inoculation with the diplococcus pneumoniæ.

J. Leon Williams (*Dental Cosmos,* April, 1899) reports having found organisms of a diphtheroid character present in a large majority of the mouths he examined, and often where there was no history of diphtheria. Some of the specimens he obtained showed the cross-markings of the Loeffler bacillus, the bacillus of diphtheria—an ærobic, facultative anærobic, pathogenic organism found in diphtheric false membranes. It is not the so-called "catching" of a disease, as we formerly thought, but the continued presence of these virulent pathogenic organisms in the oral cavity, which, gaining control over us when physically below par—as in accidents, injuries, etc.—induce pathologic disturbances.

Robert T. Morris says: "We see cases in which teeth have been removed while there is an abscess of the tooth in an acute, progressive stage, when the abscess is forming. The bacteria are in a state of active proliferation—very active development. If a very small fragment of the bone be broken, the veins of the cancellous structure of the bones fill with thrombi, which, becoming infected, become emboli, and embolic infections follow three or four days after the accident."

D. J. Brown says that healthy oral cavities and their adnexa are especially exempt from infectious processes following injuries, while an oral cavity which is septic from an abscessed tooth-traumatism without preliminary after treatment is very dangerous, on account of the possibility of extension of the suppuration to some

distant part. If a number of micrococci gain entrance into the bottom of the wound, they at once multiply, using the blood-clot and its extensions into the blood vessels, together with the adjacent dead tissues, as a welcome soil for their development.

He cites the following case: A young lady of twenty-three. History, abscessed tooth of six months' standing, accompanied by swelling, chills and fever. Tooth extracted without preliminary treatment. Infection manifested itself in two days throughout the neck, chest, abdomen and anterior spine of the ilium. Diagnosis, abscess in several places in the body, necessitating several operations, patient finally dying of general toxemia. Dr. Brown says: "Here is a case of secondary infection through the lymphatics from the oral cavity, in which a young and vigorous woman lost her life from lack of preliminary and post-operative treatment for the removal of an abscessed tooth." His other cases show how readily the lymphatics carry bacteria and toxins.

Dr. John Jesensky of Prague reports, in the *Dental Cosmos* for July, 1901, a case of suppurative inflammation of the upper jaw. Alveolar periostitis was present, and a painful and forceful extraction resulted in an infectious periostitis and osteomyelitis, which spread rapidly through the upper alveolus.

Endelman (*Dental Cosmos*, September, 1906) says: "The involuntary ingestion of the pyogenic products of pericemental inflammation is, in addition to some well-defined abnormal changes, responsible for the onset of a series of general systemic manifestations which may be regarded in the light of a pneumococcus toxemia, for sufficient clinical evidence has been gathered to prove that, at least in some typical cases of pericemental inflammation, the diplococcus pneumoniæ is one of the most conspicuous components of the mixed invasion. The manifestation of this pneumococcus toxemia in the shape of a decrease of vital activity and resistance, with consequent loss of appetite, malaise, lassitude, etc., in turn aggravate the oral conditions, and thus a pathologic cycle is established, the consequences of which may vary in severity, from general malaise to symptoms of such an intensity as to endanger the life of the individual thus affected."

Thus we see that the danger of septicemia is ever present in extraction, as it is very difficult to keep aseptic a mucous surface, especially a blood-clot, that is constantly bathed in septic

matter and pathogenic micro-organisms. Septic blood conditions have been observed in pyorrhea of the nature of those occurring in carcinoma.

D. C. Sabatier, in an exhaustive study of septicemia of bucco-dental origin (*Dental Cosmos,* June, 1904), among many statements says: "It has been observed that serious complications follow occasional lesions of the teeth and suppuration of the gingivo-dental region and stomatitis, owing to a systemic intoxication by varieties of microbes or their toxins. . . . These intoxications, which belong to the type of septicemiæ, may be of the following varieties: (a) Chronic septicemiæ, almost always consecutive upon prolonged suppurations of the gingivo-dental region. (b) Acute septicemiæ, which are stages in the course of chronic septicemiæ, or else true acute attacks following surgical interventions or other causes which render the organism more vulnerable. . . . In the majority of cases, the progress of acute septicemiæ is fatal. . . . The possibility of severe intoxications following suppuration of the gingivo-dental region explains the necessity of combating by all the means at our disposal any suppuration, whatever be its degree of intensity."

Morris says that as a general principle, the greatest danger of surgical intervention is at a time when bacteria are rapidly proliferating. He has seen two or three cases of infections in the course of a week, resulting from the removal of teeth the seat of acute alveolar abscess.

Dr. Wm. Hunter, in articles published in the *British Medical Journal,* says that oral sepsis is of a particularly virulent character. An extensive pathologic experience has satisfied him that no pus-organisms are so virulent as those which are instrumental in the causation of necrosis, and how frequently do we find necrosis in our extractions.

Morris is quoted as saying that there is no operation in minor surgery that is so fatal as the extraction of lower molars, especially the third molars the seat of acute alveolar abscess.

C. A. Harmann, M. D., reports three cases of suppurating sockets of teeth, resulting in submaxillary and parotid infection, followed by septic thrombosis of the cavernous sinuses and death. His explanation of the path the infectious process follows in

these cases of extension from the teeth to the cavernous sinuses is interesting. He says: "The veins which return the blood from the teeth pass to the pterygoid plexus, which is situated about the pterygoid muscles and in the fat of the cheek. This plexus communicates with the cavernous sinus by means of small veins, which pass through the foramen Vesalii, foramen lacerum medium, foramen ovale, and along the internal carotid artery; in addition to this, there are connections between the plexus and the inferior ophthalmic vein, through the spheno-maxillary fissure. The ophthalmic vein empties into the cavernous sinus. Given, then, a suppurative process about the teeth, such as pyorrhea alveolaris, an alveolar abscess, or indeed any septic process about the jaws or face, it is easy to see how extension to the sinus may occur. If the sinus is thrombosed, the ophthalmic vein of course cannot empty itself, and consequently the blood is retained in the orbit and the eyeball is pushed out—the pathognomic sign of cavernous sinus thrombosis. Thrombosis [septic] in the cavernous sinus is practically always fatal."

He also cites a case of fatal sepsis following the extraction of a molar upon the pericementum of which an abscess had developed. Death was due to thrombosis in the cavernous sinus.

Inflammatory phenomena resulting from infection of the alveolus subsequent to the extraction or by the retention of the abscess sac are usually accompanied by pain. Infection in such cases may follow from three to four days after the extraction.

In the *Dental Cosmos* for October, 1906, is an abstract from *Semaine Mèdicale,* giving a case of death following the extraction of a tooth under cocain and adrenalin anesthesia, the case having been reported by Dr. Maragliano, of the Faculty of Medicine, Genoa, Italy. The tooth was extracted owing to a severe attack of alveolo-dental periositis. On the following day there was intense fever, and in addition the gingival tissue presented the appearance of having become the seat of an active necrotic process. Symptoms of intense purulent infection soon appeared, and culminated in the death of the patient, which occurred eight days after the extraction. The reviewer (*Cosmos,* page 1061) says: "Although the extraction of a tooth during or shortly after an acute attack of pericemental infection is *per se* ample cause to account for a fatal termination, Dr. Maragliano opines that the

accident might have been averted had the extraction been performed without the therapeutic assistance of the cocain-adrenalin solution. To the reviewer such a view of the case seems hardly plausible. The nucleus of infection was present before the injection was performed, which at the utmost could only have intensified the inflammatory process. . . . . Fatal cases traceable to pericemental infections are not so rare as the author seems to imply, and many just such cases as the one here reported can be found recorded in medical and dental literature. The severity of the symptoms and the fact that death did not occur until a week after the extraction point strongly to septicemia of dental origin as the paramount cause of the fatal termination."

Dr. Low, in discussing Dr. Morris' paper, before quoted, thought that the difference of opinion as to the immediate extraction of the abscessed teeth might possibly come from the fact that in private practice we see a different class of patients from that of a hospital clinic, the latter being, as a rule, physically below par. But even if grave danger be coimminent with extractions only in public clinics, we should not dismiss the subject lightly. Anything less than our best efforts may result in severe injury. We all have the physically deficient in our practices, rich and poor alike.

ANSWERS OF VARIOUS PROMINENT MEN TO CERTAIN QUESTIONS.

Letters were addressed to Drs. G. V. Black, G. V. I. Brown, E. C. Kirk, R. H. Hofheinz, R. Ottolengui, T. W. Brophy, H. J. Goslee, F. B. Noyes, C. M. Paden, Frank French and M. I. Schamberg containing the first extract [see page 709] from Dr. Morris' paper—the relation of extraction to pneumonia—and the following questions:

I. What, from your experience and observation, is your opinion of the above?

II. Do you (or did you) ever hesitate to extract in cases of pericementitis and alveolar abscess, or any acute alveolar infection?

III. If so, in what instances and for what reasons?

IV. Do you differentiate in extraction between pericemental or alveolar infections caused by colds and those due to other causes?

V. In your experience, do you think there is any danger (as

per extract) attending extraction at any stage of alveolar infection?

VI. If so, what dangers, and for what reasons?

DR. G. V. BLACK.

Dr. Black's answer is as follows:

I suppose this is a continuation of the discussion that has been going on for years, certain writers and clinicians opposing the extraction of teeth during the acute periods of alveolar abscess. My experience and observation seem to warrant me in saying that whenever dangerous symptoms come up in the course of alveolar abscess, the most certain way of abating them is to at once extract the teeth concerned. In saying this, I do not wish to infer that this will in every case relieve the symptoms or bring about a radical cure of the case, but the rule is, that it is the safest procedure. It is usually the continuation of severe inflammatory and suppurative processes that causes wide necrosis of bone and septicemia, and in my observation the occurrence of septicemia, particularly, is the most dangerous feature of alveolar abscess.

As to pneumonia occurring from these infections, I have no knowledge, having never seen a case, and should not say that such a thing is impossible; yet taking all the circumstances into consideration, it does seem rather improbable. I have had personal knowledge of three cases of abscess of the lungs resulting from the injection of phenol for the radical cure of piles. In these cases the phenol was injected into a mass of loose and very vascular tissue; probably coagula at once entered the veins and were conveyed to the heart, and from the heart to the lungs, where they lodged. The chances for such an occurrence from alveolar abscess are not nearly so good as they would be from such tissue as that in which the phenol was injected. In these cases of alveolar abscess the tissues are filled with the inflammatory products, and the vessels for the most part are closed, giving conditions which are exactly the opposite of the cases I have stated, in which the floating away of coagula in the blood-streams would be least probable, and certainly would occur least often. While it seems to be the case, it may be possible that I have overlooked cases of pneumonia—or so-called pneumonia—resulting from the transplantation of micro-organisms to the lungs,

but it is difficult to think that this should occur in any considerable number of cases without there having been more explicit observations of them.

In your fifth question you ask, "Do you think there is any danger attending extraction, at any stage of alveolar infection?" I will say in answer to this that there is often danger of septicemia resulting from alveolar infection. I think that the extraction of the teeth in these conditions is the best way to avert the danger, though it may not always be successful. *As to the general subject, I will say that there are quite a number of deaths occurring from infections in connection with alveolar abscess that are not being reported as such.* [Italics mine.—G. B. M.] So far as I am able to get the history of these cases, and to judge from my own observations, they are all deaths from septicemenia. Several have occurred in Chicago, and I have reports of a number of others; in my practice death has been very narrowly averted in a considerable number of cases. All of these have taken on the phase of septicemia, and in none of them, that I know of, has lung trouble of any kind formed a principal item in the conditions found. The *danger to life* from alveolar abscess is not at all sufficiently recognized, and in my opinion, deaths occurring from this cause should be carefully reported with all the attendant symptoms, until such time as the dental profession, and the medical as well, recognize these dangers and the particular directions that the malady induced takes.

DR. E. C. KIRK.

Dr. Kirk's letter is as follows:

In the first place, the statement quoted is a very general one, and would have been more satisfactory—and I may say of more scientific value—if the author of the paper had cited cases of this character in which the indications were sufficiently strong to leave no reasonable ground for doubt that the fatal pneumonia arose from an infection via the abscessed teeth; and it would have been still more interesting and important if he could show by cases that it was the operation of extraction of the abscessed teeth that led to the lung infection, and that it was not the inflammatory condition that necessitated the extraction of the teeth which was the cause of the lung infection.

It has been pretty clearly made out through bacteriologic re-

searches, first, that the pneumococcus is a nearly constant inhabitant of the human mouth; some authorities assert that in as high as eighty per cent of human mouths the pneumococcus is to be found; and it is still further pretty clearly made out by laboratory research that the pneumococcus is one of the principal exciters of inflammatory conditions in the pericemental membrane, and that the infection of the pericemental membrane may, and usually does, take place via the pulp-canal, when that canal is exposed; and that it may take place through the blood-current, or possibly through the gingival margin, in cases where the pulp-canal is not open, but where we have that type of abscess which has been called pericemental abscess—that is to say, abscess upon teeth with living pulps. The pneumococcus is apparently the exciter of the initial pericemental inflammation, and when the inflammation is once lighted up, the bacteria of pus-formation invade the tissue, forming a true abscess. Under these conditions, as you will see, an inoculation of the tissues by the pneumococcus has occurred even before the tooth is extracted, and it is questionable to my mind that the extraction of a tooth under conditions of active inflammation from such an infection adds one iota of danger to the subsequent infection of the lung. On general principles I am of the opinion that it is good surgery to remove such an abscessed tooth, because its infected pericemental membrane is the focus of inflammation, and because in the majority of cases the removal of a tooth which is the focus of infection tends to relieve the inflammation; or, otherwise stated, on general principles I am of the opinion that in cases where a secondary pulmonary infection occurs, it would happen equally whether the tooth were extracted or not. It is good surgery and rational therepeutics to remove the source of infection in all cases, and I cannot see that the retention of the tooth would reduce the chances of the pulmonary infection in any case where it was likely to occur from a dental origin.

I never have known of a case where I could reasonably trace out a connection between a dento-alveolar abscess and subsequent pneumonia. I have, however, seen cases of extensive necrosis of the lower jaw, with exfoliation of a considerable portion of the alveolar border and loss of a number of sound teeth, due to infection from the pneumococcus, and where that organism was defi-

nitely determined by well-known research methods to have been the exciter of the necrotic inflammation, and where the original point of entry was through the open canal of a carious tooth.

You will see from the foregoing that I cannot take the ground which the author of the extract appears to take—that there is danger in the extraction *per se*. I should no more hesitate to extract an infected tooth than I would to remove a splinter which was the carrier of infection and cause of suppuration somewhere in the tissues of the body. There is a very palpable danger in cases of extraction during abscess of a tooth that the extractor may be charged with causing the infection, because the removal of a tooth does not, in all cases, cure the abscess.

DR. G. V. I. BROWN.

Dr. Brown's letter is as follows:

No. 1. I heartily agree with the statements of Dr. Morris, and am glad to see attention called to the more serious aspect of diseases of the teeth and alveolar structures in relation to fatal results. My own work being almost wholly confined to hospital cases, such conditions as the extract refers to naturally come under my observation more than ordinarily would be the case in office practice; and I have constantly endeavored, during the past few years, to bring forward the idea of the fatal possibilities that lie directly in line with many pathologic affections that dentists commonly undertake to treat. The only criticism that might be made with regard to the extract is the fact that it lays so much stress upon pneumonia, when, as a matter of fact, the pneumococcus and its direct results are only a part of the pathogenic enemies to be feared. How many lives dentists could have saved with a better knowledge of pathology will never be known. How many they may save can only be discovered by actively bringing forward the urgency of such considerations, and as your questions appear to be most timely in leading in this direction, it gives me pleasure to answer as fully as possible under the circumstances.

My answer to No. II must be—Yes, subject to explanations of No. III.

In question No. III one must differentiate between acute and chronic conditions; between those in which there is general manifestation of toxic influences; between cases in which large gather-

ings of pus can readily be evacuated without exposing freshly open vessels to infection, as might be the case under immediate extraction, and between those patients in whom blood examination shows marked deficiency of those elements upon which dependence must be placed in battling against septic dangers. Often the question is a very difficult one to decide, *i. e.*, whether the danger is greater in allowing the direct cause of irritation and infection to remain while other measures are employed to give relief, instead of resorting to immediate extraction, or whether the complete removal of the exciting cause would give more prompt relief, and in the end be safer.

Question No. IV does not appear to be quite clear.

Question No. V appears to have been already answered. No. VI is partly answered by the cases quoted in the inclosed reprint, in two of which the patients died from what appeared quite insignificant causes. In one case the trouble began in the region of the third molar, and ended in coma and death. In the other case there was no more serious appearance than that of ulcerative stomatitis and pyorrhea alveolaris, yet each organ of the man's body showed round-cell infiltration and degenerative processes similar to those shown in sections taken from the mouth. One other case, a more recent one, might properly be reported in this connection. A man came to me for operation at my clinic at the University of Iowa. I refused to operate unless he would delay it long enough to enable blood, urine, and other examinations to be made. He went to a general surgical clinic in order to have immediate operation for the cure of what appeared to be a disturbance of the lower incisors, with necrosis of the surrounding alveolar structures. A general surgeon undertook the case and performed the operation at once, with the result that the patient died upon the operating table.

Undoubtedly, in vast numbers of cases with conditions of otherwise reasonably good health upon the part of infected individuals, the most prompt and efficient method of giving relief is by removal of the direct cause of infection, whether it be tooth or alveolar structures; but when the blood examination shows that the hemoglobin is lower than normal, and the blood corpuscles are disarranged in their numerical proportions to a degree indicative of disease; or when temperature and pulse or urine or bacterial

conditions present indications of serious pathologic disturbance, the question of these or other physical signs of diminished bodily resistance must be weighed carefully against the local demands for immediate intervention. It is my invariable practice, wherever possible, to have such examinations made in cases where the symptoms indicate rather serious conditions. This has been a great safeguard to me, and I know of no other means by which one may safely arrive at a true understanding of individual conditions upon which a decision as to the method of procedure must be based.

DR. R. OTTOLENGUI.

Dr. Ottolengui's letter is as follows:

In reply to your inquiries regarding extraction of teeth in the presence of pericementitis and alveolar abscess, I beg to state that in my opinion the tooth should be removed, and I should not hesitate to do so. I do believe, however, that Dr. Morris has issued a word of warning that might well be heeded by the profession. One trouble of the present status is that a number of men send extracting cases to a specialist. The dentist seems to think that his care of the case ceases with the recommendation. On the other hand, the specialist too often dismisses the patient after extracting the tooth and receiving his fee. The result is that the wound receives no after-care. In my practice, when I send a patient to a specialist for the removal of a tooth, I either have it definitely understood that he is to continue the treatment of the case until the wound is healed, or I take charge of that portion of the work myself. In other words, the removal of a tooth, especially in the presence of infection, demands the same surgical after-care as would be accorded to similar conditions elsewhere in the body.

DR. R. H. HOFHEINZ.

Dr. Hofheinz's letter is as follows:

In answer to your questions I beg to say—

(1) That there is infinitely more danger in leaving an abscessed tooth in its socket too long than there can be in its removal.

(2) I should never hesitate to extract in cases of pericemental or alveolar abscess, provided I could not by other means restore the surrounding tissues to a normal condition.

(3) Causes of all pus-formation should be well and carefully differentiated. If due to a local affection, cure can certainly be much easier obtained than if it were due to a systemic diathesis.

(4) I can see no danger in extraction; it means in most cases simply the removal of the cause—the rational treatment of all diseases.

Septic pneumonia, embolic pneumonia, if at all due to abscessed teeth, are not due to the extraction of the diseased teeth *per se*. They are due to the fact that the teeth were not extracted in time, thus allowing the pus to be absorbed, and to produce a remote septic condition.

DR. M. I. SCHAMBERG.

Dr. M. I. Schamberg replies as follows:

I was present at the meeting at which Dr. Robert T. Morris read the paper from which you have taken the extract quoted in your letter. In the discussion of the paper, my remarks were in opposition to the views of the essayist in regard to the danger of removing abscessed teeth during the acute stage, and I am still convinced, owing to many cases which I have seen, that more harm will result from the advocacy of the retention of such teeth than from their prompt removal. Unfortunately, Dr. Morris' statements in regard to the frequency of deaths following extraction are irrefutable, but he has not arrived at the actual cause of these fatal terminations. Death in such cases occurs in spite of the removal of the cause of infection, rather than because of it. Teeth are retained for too long a period, in an attempt to await the passing of the acute stage, during which time the suppuration makes more progress, and the system of the patient becomes undermined. Septicemia and pyemia are the natural results of the prolonged retention of pus. It is an interesting observation that Dr. Morris has made, that such cases exhibit evidences of embolic pneumonia.

I never hesitate to extract a tooth because of an acute infection, if I am reasonably sure that the tooth should be sacrificed. If an acute abscess can be induced to subside, and the tooth be conserved by an incision of the gum tissue or a puncture of the process, I believe this to be the best means of dealing with abscesses during the acute stage; not because I fear the consequences

of taking out the tooth, but rather to save what may be a valuable masticating organ. To say that "the extraction of a tooth during the active process of inflammation or suppuration is without danger" would be a misstatement, unless it were added, "providing the case was handled as the careful surgeon would treat any other inflamed or infected wound." Complications will arise in the extraction of teeth so long as operators fail to realize the importance of dealing with this operation as similar conditions are handled in other parts of the body.

CONCLUDING REMARKS.

There has been, and there is to-day, a general lack of sterilization of the oral cavity before and after extraction. To the knowledge of the writer, no anti post-extraction sterilization of the mouths of the patients is insisted upon in our colleges. In the eight years of his dental experience, he has yet to see the practitioner who sterilizes instruments and field of operation before and after extraction. To neglect this important operation is criminal malpractice. One must instruct the patient as to the proper care after extraction. The extraction of a diseased tooth surrounded by diseased tissues is a source of great danger to the patient. If you send the latter to a specialist, see to it that either the specialist or yourself treats the wound as a surgeon would. Patients are more lax in returning after extraction than after any other operation.

The idea that the saliva is in any way germicidal is an erroneous view, as has been brought out by Miller's experiments. They have established the fact that neither the oral fluids nor their separate constituents (mucus, potassium sulfocyanid, etc.) have the power to arrest or even perceptibly retard the growth of bacteria.

"Aseptic surgery is the only surgery known to-day by men of established reputation. It is just as true of the dental as of medical work. Those who adopt it least will always be the last." The writer does not wish to step into the field of oral prophylaxis, but is of the opinion that that field has just awakened to its infancy. We do not know, cannot see, nor are we able to realize the tremendous benefits to humanity that oral prophylaxis will accomplish in the future. The public will come to us as a profession for preventive medicine, and we will then be *the* professional men

par excellence. Our field is going past that of medicine in its relation to humanity's welfare. We are going to prevent illness, not cure it after it has arrived.—*Dental Cosmos.*

ORAL HYGIENE IN OUR PUBLIC SCHOOLS, ITS RELATION TO DENTISTRY AND HOW THE WORK WILL BE CARRIED ON. By Dr. T. Franklin Gifford. For a number of years the dental profession has realized the necessity of proper instruction to the public in oral hygiene, the anatomy, nerve and blood supplies, functions of the teeth and adjoining parts and their relation to other parts of the body. The profession sees the need of short lectures in our schools, realizing from experience that many children's mouths are in such a filthy and unhealthy condition, teeth decayed, abscesses and mouth full of disease microbes, some of them being the most contagious and infectious. The cause of many children being dull in their studies can often be traced to bad teeth.

If the importance of correcting teeth defects at an early age was more generally recognized by parents and teachers we would hear much less of the harmful influences of our schools on the eyesight of children, and the number who pursue the course to the end would be materially increased.

Many parents, though interested in the welfare of their children in all other respects, neglect this most important duty, not appreciating the fact that a large number not up to the average in the class or who suffer from toothache, earache, sickness, weak digestion, St. Vitus' dance, epilepsy, headache and physical breakdown owe their ills to some defective tooth or teeth.

The correction of the refractive errors early in life will not only prevent disease, but by favorably influencing physical and mental development will sidetrack inherited tendencies.

It is a well-known fact that many nervous wrecks, who are supposed to be invalids from inherited causes, have inherited only defective oral conditions, which, like those of their parents, have not been corrected.

The continued leak of nerve force from this cause and from the nightmare of the thought that sooner or later they will be compelled to surrender to the inevitable so reduces the nerve force that,

if called upon to go through a great strain they collapse, when under other circumstances the trial may have strengthened them.

The following statement was made by an eminent German doctor, Myer, in a German medical journal: "The nervous diseases of school children is an interesting question from the point of view of one who has had exceptional opportunities to observe the frequency with which children are affected with nervous affections. One thousand eight hundred and fifty-seven school children were so examined, with the result that 130 were found to be nervous, which is 7 per cent, and out of the material of 1,068 that had never gone to school 2.6 per cent were nervous."

In America the percentage is much higher. A statement has been published recently that out of the 162,000 school children in Philadelphia, 80,000 were nervous or had eye trouble, according to an article that I read in the *St. Louis Clinique,* by Dr. S. S. Bishop of Harrisburg, Pa.

Dr. Darlington, health commissioner of New York City, made the statement some time ago before the Academy of Medicine at Harrisburg that 40 per cent of the school children and 98 per cent of the truant children of that city were physically defective.

It does not fall within the province of the dentist or physician to sit in judgment upon the methods adopted by the teacher in the school; but when physical injury is likely to occur as a result of methods that are or are not employed, the medical and dental profession should insist upon the abandonment or adoption of methods that will prevent injurious methods of school life.

For when we consider that the destiny of this nation will be committed to those who are now in its schools; that a happy and useful life and a peaceful conscience depends upon the health of the individual, it is obviously important that every effort should be put forth to prevent physical degeneracy, and, as far as possible, sidetrack inherited tendencies during the years of physiologic growth, which are the years of school life. A child should not be allowed to drift down the stream of life to physical insufficiency, but the teacher should come to his rescue in any moral, mental or physical defects which have been acquired or inherited, by piloting him up the stream to the hills wherein lies the hidden treasure of physical strength.

Education does not consist simply in the acquisition of knowl-

edge. The great idea underlying all instruction should be to fit and stimulate the scholar according to his individual ability; this of course requires teachers of intelligence and discernment, to whom their calling is not merely a routine business; many who are well qualified for the moral and mental training of children accept the important responsibility with no knowledge of the physical condition, or whether a child is physically equal to the requirements of school life. The teacher should see that the book is held at the proper distance, in a good light, and a study of facial expression and head posture should be made. He should familiarize himself with the symptoms of the teeth, mouth, eyes, ear, nose, and throat defects, so that, while he can not make a diagnosis, he *can* know when there is something wrong.

In many of the schools the medical inspector is employed to examine any child detected by the teacher appearing in an abnormal condition. The results of this work are beyond comprehension. Children should never be condemned or discouraged on account of any weakness, but should be encouraged by an extra effort being put forth to strengthen weak points. Much depends upon the way a child is started. It may be thought he has no turn for mathematics, but the sole trouble is that he does not see the figures correctly; some children with astigmatism can not distinguish 3 from 5, 6 from 8 or 9, and consequently never have the correct answer to an example. A philosophic and intelligent dealing with this condition would prevent many from selecting a vocation in life which is distasteful, and which was chosen by them from supposed necessity; from this cause the shore of life is strewed with wrecks.

Many children are either under or over fed, or are allowed to eat candy to excess; others live in unsanitary houses or are victims of unwholesome habits. Some are ambitious and pore over their books in the evening, often in a badly ventilated room and with a poor light, or rush to school in the morning without breakfast, or one swallowed in haste without proper mastication, and in consequence are not able to stand the strain of school life.

When a child enters school an estimate of his general strength should be made, for it is most important to remember that though the demand by work upon the muscles of the eye may not be unreasonably great in itself, yet it may be altogether excessive in

relation to the individual to whom it is made. Many children enter school in more or less enfeebled health, and their work must be adjusted accordingly, or they will be condemned to the stern law of the survival of the fittest. Children having sore or inflamed eyes should not be allowed to enter school without a certificate from a physician to the effect that the disease is not infectious. Unless the child has a certificate stating that he is under the care, or has been treated by a competent oculist, the acuity of the vision should be taken by the teacher when the child enters school, or at any time when there is a suspicion of anything being wrong.

A child should be encouraged to form regular habits. The world does not depend upon the genius; nor should the prodigy in the class who studies at the expense of his health for popular applause be set upon a pinnacle for an example to other pupils. Regularity of habit, work well done, promptness, cleanliness, should be the standard, and if a child falls behind, lacks ambition, is listless, is drowsy, has symptoms of defective teeth, eye strain or manifests any nervous symptoms, his parents should be urged to have him intelligently looked after and treated. Parents invariably feel grateful when interest in their children is manifested. I never knew one to object to, or resent an approach of this kind, unless it were done in a spirit of fault-finding or pointing out defects in a way that savored of criticism, ridicule or condemnation. Careful observation, intelligent care and treatment will amply repay the teacher, not only in increased learning capacity of the pupil, resulting in much less tax on the teacher's own time, patience and endurance, but he can enjoy the great reward of knowing he has helped to properly equip children for a useful life.

I believe the chief cause of nervous diseases in school children is defective teeth and abnormal oral conditions. No one can properly masticate with bad teeth, and a child not being able to masticate properly produces abnormal conditions of the stomach, and not developing as it should, becomes an anemic. The system being deprived of its normal functions, abnormal conditions will arise as peculiar sensations in the head, vertigo, nausea, dyspepsia, chorea, insomnia, epilepsy, hysteria, nervous prostration, insanity and general failure of health.

Ninety-five per cent of the people wearing artificial teeth are suffering from several of these conditions. Most all wearers of

artificial teeth are regular contributors to the physician, suffering from what the patient claims, heart trouble, which is really stomach trouble caused by improper mastication and by improper insalivation, the digestive organs are called upon to do excessive work; the nerves being the conductive power are called upon for an extra supply of current, and by doing so take what should go to the other parts.

The pneumogastric nerve, as we know, supplies the stomach as well as the heart. By the increased movement of the organs of the stomach we have an increased action of the heart, and by long excessive activity of the heart's action it becomes weak, as a worn-out machine caused by excessive use.

To the progressive dentist of to-day he sees the artificial plate gradually diminishing, he sees fewer extractions, but this is only within the radius of his practice. He looks further and sees the thousand who have not had the knowledge imparted to them concerning the value of their own teeth. How are we going to impart this knowledge? Through the schools is the only solution. Habits formed during childhood, whether good or bad, will continue through life. It is an old saying—train the child right and it will live right.

The dental profession in some of the states has tried to have appropriations made to take up this work but has failed. There has also been an effort to give a certain number of lectures in the schools and to the public, but these attempts have also failed, owing to the lack of funds. Some state societies have made an effort by appointing a member from each county as county examiner. The results from this can not be claimed to be a success, as there are few in the profession who are fixed financially to warrant their giving their time without compensation. Yet many dentists would do so could they afford it.

It is found, on investigation, that the dentist who was appointed by his society as county examiner has been the loser, not only in valuable time but in his practice as well; for the public has looked upon such a movement as a personal gain to the dentist to increase his practice, while the society has conferred the appointment upon him in order to benefit the public.

Dr. William G. Gelston, chairman of the committee on oral hygiene of the Southern Dental Society (New Jersey) with his

committee has been extremely active endeavoring to educate the teachers of our public schools. This same activity has shown itself throughout all the Jersey dental societies.

In Philadelphia, Dr. Fauth, I understand, has given a certain number of lectures in the public schools. With what results I have been unable to learn.

Dr. P. D. Houston of Lewisburg, Tennessee, in an address before the Tennessee State Dental Association suggested the formation of a text-book on oral hygiene for use in the public schools and pleaded for an active campaign for this work in Tennessee. The results I have been unable to learn.

In New York City the medical profession, as well as the dental profession, realizing the defective condition of a majority of children attending public schools, has taken the lead in this work and has, through the Board of Health, been able to have medical examiners appointed whose duty it is to visit the respective schools every morning at a stated hour and examine any child sent to them by the teachers for suspected contagious diseases. The inspectors exclude children found to be affected with such diseases and readmit them only after a second examination and after the premises where the children live have been disinfected. Nearly all epidemics have their origin in the school and the spread of contagious diseases among children usually takes place through the eminent association in which they are brought.

In 1901, in the Low administration, a corps of nurses was added to the corps of inspectors. The duties of the school nurses consist in promoting the cleanliness of the children and in treating minor ailments of the skin and eye under the direction of the inspector. The results are cleaner and healthier children. Through this agency one of the most dangerous forms of contagious eye diseases (trachoma) was greatly reduced.

The number of cases of trachoma in the schools of Manhattan Borough on March 31, 1905, was 17,710. A year later, on March 15, 1906, a careful census showed only 12,000 cases, according to Dr. Thomas Darlington, commissioner of health, under whose administration this new work was established.

I am indebted to Dr. John J. Cronin for notes taken on New York City, published in the April number of *The American Monthly Review of Reviews;* and into every home in the civilized world

the April number ought to go, so that one can read the doctor's valuable article.

Of 99,240 children examined in the schools of the Borough of Manhattan from March 27, 1905, to September 29, 1906, 65 per cent needed some form of medical treatment; 30 per cent required correction of defective eyesight, in most cases by eyeglasses, and a still larger percentage needed dental attention.

It is exceedingly pleasing to know of the wonderful results they have obtained, yet the system comes far from being perfect, although efforts are being made to complete same.

The Board of Health, realizing the necessity of instruction in oral hygiene, has made arrangements for a limited number of lectures to be given at stated times in the New York schools. This is only a step in the right direction—they need to go further—and in connection with their medical examiners, dentists should be employed to examine the mouths from a dental standpoint and render such treatment as is required, as the mouth is the medium culture of millions of germs, both disease producing and non-disease producing, some of these being the most contagious.

In an editorial by Dr. Wilbur F. Litch, in May (1907) *Dental Brief* on "The Teeth of Children in English Elementary Schools," we find that recruiting statistics show a great majority of would-be recruits to be lads between 18 and 19 years of age, and that of those recently presenting themselves for examination 75.32 per 1,000 were rejected on account of "loss or decay of many teeth."

A memorandum made by the British Dental Association shows that out of 10,517 school children, averaging 12 years of age, 1,508, approximately 14 per cent of the whole number, has sound teeth, while among the remainder were found 37,105 unsound teeth, and a loss by extraction 2,174 teeth, presumably unsound; this making a general average of four unsound teeth for every child; an average which, in the absence of preventive measures, is certain to increase with a child's advancing years. Thus far New York is the only American city in which dental treatment for the public school children has been officially provided for. In that city a committee on "physical welfare of school children" has organized a staff of twenty dentists for school work, their services being for the present rendered gratuitously.

In Germany the movement is making far more rapid and satis-

factory progress than in any other country. What has been accomplished in Strassburg and Darmstadt was the subject of editorial mention in the *Dental Brief* for August, 1906. In addition to these cities, Wiesbaden and Muhlhausen have instituted regular inspection of the teeth of school children, and at Ulm a dentist gives his entire time to school work. Austria is also moving in the matter, and in Prague six school dentists have been appointed. No one familiar with the facts can doubt the important influence which the proper care of the teeth of school children in America must exercise upon their physical well being, and ultimately upon that of the whole American people. If systematic dental care is to become a fixed feature of the public school system a campaign of education for those not familiar with the facts must be organized. It is a campaign, if prosecuted with zeal, persistence, and above all, with discretion, cannot fail of ultimate success. To organize and so conduct that propaganda is the most important duty now confronting the dental profession.

The American dentist is looked upon as the leader in the field of dentistry. He is the ideal and shall we, after reaching the heights and receiving the honor and endorsement of the foreign countries, shall we, as American dentists, rest on our honors and allow our foreign brothers to take the lead in this work? I say, *no.*

If proper oral hygienic measures were resorted to, many children suffering from various forms of disease, both contagious and infectious, would be alleviated from same.

It is proved by experience that the greatest suffering caused by defective teeth is during the school days; many a valuable hour is lost from the intense suffering wrought by decayed teeth, especially at the time the first teeth are giving place to the second. Habits formed during childhood are much easier broken while young than in adult life. The time to correct mouth breathing is in early childhood. Catarrhal conditions and adenoids (a soft growth in the vault behind the soft palate) are caused by mouth breathing. These should all be corrected in early childhood, as perfect breathing is one of the greatest secrets of perfect health. In perfect breathing we have the proper chest and lung expansion. This is a feature that is even less talked of and should come in the physical training of the child.

Dr. Thaddeus P. Hyatt of Brooklyn, N. Y., has been most enthu-

siastic in this line of work. In Brooklyn he has given illustrated lectures on "The Care of the Teeth" to the public. He has also gone into some of the schools in Brooklyn, with the assistance of other members of the profession, and examined some of the school children's mouths and the results of his investigations were astonishing. Out of 600 examined there were only some 19 who did not need dental attention. In some of the foreign countries where this work has been taken up, in examining the mouths of the school children the percentage has been even greater.

In one of the cities of Ohio several members of the profession got together and fitted up a place where each member in turn would go certain days of the week and give their services free to those who could not afford to pay for proper dental treatment. It is reported that owing to the lack of funds they have not been able to carry on the work.

A crying need is felt by the profession and the public for an association that can be financed by public or private contribution, so that men of high standing can be employed having the interest of the public and profession at heart, to discontinue their practice and devote their entire time to this work: to go into our schools, examine the mouths of the children, fill out a chart, submit it to the teacher, who in the monthly report will forward it to the parent or guardian, telling them this is a true examination of your child's mouth, and recommend that they take the child to their family dentist; a copy be kept by the association, and a copy be forwarded to the National Dental, to be used as they deem best: these dentists also to give short talks on the value of oral hygiene and to illustrate fully by chart.

I believe the most successful way to educate in any line is by the use of charts, stereopticon or blackboard, as object lessons are the idea. The child sees and formulates ideas of his own, and in this way you cultivate and develop a self-thinking man that will ultimately give us a race far in advance of this present generation. We realize that there are a number of children attending public schools whose parents can not afford to give them proper dental treatment, and after a national educational campaign has been inaugurated and statistics acquired sufficient to show and prove the value and need of this work, then would be the time to go before our city, county and state representatives and ask for appropriations

sufficient, so that in connection with the medical inspectors and also the nurses that are now employed in our schools we may have a Dental Chair established and those children whose parents are too poor to pay for their needed dental treatment may receive same without cost.

A report of this work should be sent to every member of the dental profession from time to time who is willing to co-operate and become a member of this association. A report of this work should also be forwarded to any medical or dental society on application to work in conjunction with any dental or medical society, to assist in the advancement of science, and also use its best efforts in promulgating anything that would be of interest to our profession, for dentistry of to-day is a medical specialty, and anything that is of interest to the medical profession is of value to the dental profession, and anything that is to the interest of the dental profession is of value to the medical profession. We can not stand apart; we must, therefore, stand together—in numbers there is strength—the time has arrived when we must attend more to legislative matters. By an association of this kind it would give us men who could make legislative matters a study.

We now have contract surgeons in our army; the valuable services which they have rendered has proved their need. This should be changed to regular appointments in our army, grading and ranking them the same as the medical surgeons, and not only this, but we should have a bill passed appointing dentists in our navy. This association should put forth every effort to have these bills introduced and passed. These dentists should go before all educational bodies where satisfactory arrangements can be made, such as teachers' associations, colleges, graduating classes, normal schools, Y. M. C. A.'s, and wherever an audience can be acquired sufficient to warrant a lecture one should be provided.

I have been informed by a number of school teachers that the present physiology now used is too deep, for they do not understand it. If our physiologies are such that our teachers do not understand them, then how do we expect them to impart the proper knowledge to our children. From members of an association of this kind articles and suggestions should be offered, such as could be used in the journals, magazines and newspapers all over the United States, to inaugurate a national campaign, all to be done

within the ethics of the profession. An ideal text-book, fully illustrated, could be formed and be recommended for use in our schools, being such that would receive the endorsement of the dental profession and of such nature that no one would hesitate to recommend.

From statistics already acquired it has proved the need of this work. I have given this a lot of my time and study, and realize that work of this nature will require a great amount of money to take it up and carry it out to success. If we could get jealousy out of our profession; if we could get our professional brothers to become broad and liberal minded, and get them to realize that there is a business side to everything; if we could get the members of the profession to go down into their pockets and contribute annually to a fund, what a great amount of suffering we would save, what good would be accomplished, what an advancement would be made in science, and how much easier would it be to practice our profession. The only feasible way that I can see to take up this great work is by interesting certain men of money or some company closely allied to the dental profession to supply the needed funds to promulgate this work in the interest to our profession and to the benefit of humanity.—*Dentist's Magazine.*

MOUTH SHOULD BE KEPT CLEAN WHEN CORRECTING MALOCCLUSION.—When a patient presents himself for treatment for malocclusion, we should be just as insistent about the general health of the mouth as we are of the teeth. I find that if a patients starts out with a clean mouth, and we maintain it in that condition, we have no fear of embarrassment from injury to the teeth during treatment.—DR. O. W. WHITE, *Items of Interest.*

AFTER-TREATMENT IN EXTRACTION.—In regard to the after-treatment, I say frankly that where I have a case of removal of a tooth in which there is acute inflammation of the pericemental membrane only. I wash out the mouth and syringe around the tooth, but never put anything in the tooth-socket after the tooth is removed, unless some subsequent trouble occurs. In cases where there is a considerable amount of pus well circumscribed, this is carefully washed out and gotten rid of, and I do not put in hydrogen dioxid, or other strong antiseptics, but wash out thoroughly, using large amounts of water. Under ordinary manipulation one can get rid of the pus, and then use antiseptics, provided it be possible to remove them afterward with sterile water. If we use strong antiseptics, we simply irritate and break up the pyophylactic membrane, and afford opportunity for the extension of the infection to tissues not involved.—*Dental Cosmos.*

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Editorial.

PROFESSOR WILLOUGHBY DAYTON MILLER DEAD; THE DENTAL PROFESSION BEREFT OF ONE OF ITS LEADERS.

At 1:30 o'clock p. m., Saturday, July 27, 1907, Professor W. D. Miller died in the City Hospital at Newark, Ohio, where five days previously he had undergone an operation for appendicitis.

The news of this sudden removal from a sphere of great activity, and of devotion to his beloved profession, will be a great shock to his many friends and admirers and bring a sense of incalculable loss to the dental profession throughout the world, as he unquestionably was the foremost scientist in his profession, and was just entering upon a new career of great importance to the profession of this country.

W. D. Miller was born August 1, 1853, near Alexandria, Licking County, Ohio, where his parents lived on a farm, which is still in the possession of the family and where he always spent his vacations when in this country. When he was twelve years of age his parents removed to Newark, Ohio, about ten miles distant from the farm, and he entered the public schools of that city and prepared for college. Graduating from the high school in 1871, he entered the University of Michigan that fall and took his degree of Bachelor of Arts in June, 1875. While in college he devoted himself especially to mathematics and physics. After graduating he decided to adopt as his profession that of mathematical physics, and went to Scotland and entered upon a course of study in the Edinburgh University under Sir William Thomson. He spent one year there, and then went to Berlin, Germany, for further preparation. Here, through overwork and study, his health gave way

and he was compelled to stop his labors to recuperate, and it was during this enforced period of rest that he found his life's great work in a most unexpected way.

At this time Dr. F. P. Abbot was the representative American dentist at Berlin. He had married the daughter of a former American minister to Switzerland, Mr. Theo. S. Fay, and his home became well known to all Americans sojourning in the German capital. Dr. Miller was a frequent guest at the home of Dr. Abbot and became acquainted with his older daughter, whom he afterwards married. Through his intimate acquaintance with Dr. Abbott, Dr. Miller became interested in the chemical aspects of the dental art and made some researches for the doctor concerning tin and gold fillings. These so greatly pleased Dr. Abbot that he induced Dr. Miller to return to America and take the dental course. This he did, graduating from the University of Pennsylvania in 1879. He returned to Berlin and took up the practice of dentistry and began the study of bacteriology with the famous Professor Koch.

From this time on he entered into the scientific work of his profession with all the zeal and enthusiasm which were so characteristic of the man, and which made him in due time the foremost dental scientist of the world. He continued a devoted student and at the same time carried on a large practice. He soon began to give the results of his scientific researches to the profession and thus entered upon a public career that involved a great demand upon his time and physical resources, so much so that he was once compelled to stop all work for a period of two or three years and give his time to recuperating his health.

In 1884 he was made professor of dentistry in the University of Berlin, the highest honor that could be conferred upon him. It is said a German professorship had never before this time been conferred upon a foreigner. In passing it is interesting to note that this act of the German government made Dr. Miller a German citizen, although he never took out German papers of citizenship, and consequently when he resigned his professorship in the fall of 1906 to accept a professorship in the University of Michigan he lost his German citizenship and became an American citizen again; or what is really the better way to put it, the German Empire lost an official subject.

In 1881 Dr. Miller began contributing his work through the dental societies; his first paper of importance was read that year at the annual meeting of the American Dental Society of Europe at Wiesbaden. This was soon followed by a series of contributions to *The Independent Practitioner,* a dental journal edited by Dr. W. C. Barrett of Buffalo, N. Y. These papers were upon the subject of the etiology of dental caries, and were received with much adverse criticism, since they propounded a new theory as to the cause of dental caries. They resulted, as we know, in the establishment of the present theory as to the cause of this disease which is now universally accepted. The work done on this subject at once established Dr. Miller's reputation as a scientist, as it was thorough and faultless. From this time on he has been a constant contributor to the literary and scientific, and to a considerable degree to the technical work of his profession.

In 1887 Dr. Miller took the "Rigorosum" examination for the medical degree in Berlin University. This is the most exhaustive of all examinations in this university, and he passed it with the predicate of *"Magna cum Laude,"* and a record of fourteen out of a possible fifteen points, the next highest record obtained by anyone at that examination being eight. As a result of this examination, Dr. Miller's position in the Berlin University and in the minds of the German dentists was made secure, as the government had been severely criticised before for retaining on the faculty a foreigner, and many attempts were made to have the Minister of Education replace him with some German dentist. At the time of his leaving Germany all prejudice had disappeared and the German dentists did all in their power to persuade him to remain and complete his work in Germany. It is reported that there was no one man to whom the German dentists were more loyal than to Dr. Miller, and American dentists practicing in Germany strongly opposed his return to this country, as he stood between them and the efforts continually being made to discredit their legal standing by German practitioners. His wise counsel and known integrity as well as his kind and generous disposition made him the most influential member of his profession in Europe. He was not only honored for his work and attainments, but he was universally beloved for his personal character, and there will now be many sad hearts where he was best known. Dr. Miller has had

a great number of honors conferred upon him. He was an honorary member of thirty-seven different professional organizations; the University of Michigan conferred upon him the honorary degree of Doctor of Philosophy; the University of Pennsylvania the degree of Doctor of Science; the Fourth International Dental Congress at St. Louis, in 1904, bestowed upon him a gold medal for a paper presented there entitled, "A Study of Certain Questions Relating to the Pathology of the Teeth." He had many other honors of which we are not sufficiently informed to speak. At the time when he was considering the question of leaving Berlin for Ann Arbor the German emperor conferred upon him the very honorable title of "Kaiserlicher Geheimer Medizinalrath," which means privy medical councilor to the emperor.

The faculty of the University of Michigan has for many years cherished the hope that some day it should have the help of Professor Miller in carrying out its plans of making Ann Arbor one of the best places of dental learning in the world, and when three years ago in a private conversation the writer learned that he was desirous of returning to this country that he might complete some work here for his profession that he very much wanted to do and which he could not well do in Germany, steps were immediately taken to bring him back to this country and to the University of Michigan. Professor Miller came to Ann Arbor and conferred with the dental faculty and university authorities, and finding that the work required of him was so heartily in accord with that which he wished to undertake and that the university was so willing to accord him the facilities for accomplishing it, he was persuaded to sever his relations with Berlin in spite of the great pressure made in Germany to dissuade him. Friends, colleagues, dental societies and the highest government officials by their appeals made it difficult for him to leave the place he had so long and acceptably filled for a new and unknown field. As was characteristic of the man, although a rich merchant of Berlin offered to build, equip and support for him a complete dental research laboratory if he would stay in Berlin, he decided to come to Ann Arbor because he could there do the work that he believed most needed to be done. Perhaps nothing can be said that would better illustrate the unselfish devotion of the man to his profession than to say that the work he planned to do here was of

such a nature that it would probably not have added a greater honor to those already conferred upon him, but it would have contributed immensely to the future welfare of his profession, and this he considered much more important than any personal emolument or renown.

The idea that inspired Dr. Miller in recent years was to find some way by which the decay and loss of the teeth might be prevented, one that could be universally applied and which especially should be within the means of people who are unable to pay for the present surgical methods of treatment. With this in view the last three years of his life were spent on an exhaustive research of the present mouth toilet preparations and prophylactic methods. He had but just begun this work and it was his purpose to continue this research until he could determine whether there was any chance of finding a solution of this problem in that direction. So far his work has thrown much light on the injuries resulting from the misuse of the tooth brush and injurious abrasive tooth powders, and has created a new interest in the chemical causes of wasting of the tooth structure. It was Dr. Miller's plan to continue this research and he had great hope that he would succeed in adding something of value to preventive methods, or at least that oral hygiene should be more scientifically practiced by the mass of the people than it now is.

There has been much comment both in this country and in Europe on Dr. Miller's decision to leave the land where so much of his life has been spent and where he had done the work that has brought to him so many honors. It is commonly supposed that it was his great love for his own country and the natural desire that seems to come to all men to get back to the home of their kinsfolk and their places of birth that led him, in spite of the many strong inducements to remain, to sever his relations with Berlin and come to Ann Arbor, where the work and environment would be new and problematic. But Dr. Miller was a wise man and he looked into the future farther than most of us. He realized that there is a great work for the dental profession to do in the near future, and that so far as he could see there was no adequate preparation being made to meet the demand which is to be made for men who are competent to take up this work and do it scientifically. He saw that at Ann Arbor the means and material could

be had for the development of scientific workers such as few other places offered. When called to accept the office of dean of the Dental Department of the University of Michigan he made his acceptance contingent on a promise that he should be provided with suitable facilities for developing this line of work. This the Michigan authorities gladly agreed to do and the new building is now under way. It was his idea that he could select from the students passing through the school such men as he might be able to influence and prepare for scientific study of the various dental problems.

He was greatly interested in the advancement of the dental educational standards and he hoped to be able to do much for the cause of higher standards in this country through his connection with the University of Michigan. He believed that the dental standards should be as high as the medical, and had well defined plans as to how this could be accomplished. He believed in the education of dentists as such and had little sympathy with the idea of a complete medical education as a foundation for the practice of dentistry. At the same time he strongly favored maintaining the instruction of the medical sciences so far as they had a value in equipping dentists for their practice, and for this reason he wanted the entrance requirements for a dental course brought up to those of medicine.

His last work was an address which he prepared for the annual meeting of the International Dental Federation, of which he was president. In this address he sets forth his views of this important question.

This brief statement of the life and work of this great man will in some measure help us to estimate the tremendous loss we have sustained in his death, at a time when he could have done so much for his profession and humanity. If his life shall stimulate others to take up the work with more earnestness we shall long have the benefit of his influence in making our profession of great usefulness to the world.

Those who knew Dr. Miller intimately speak fervently of his goodness of heart. He was naturally a modest man, but a man of very strong affection and was devoted to his family. He was an active supporter of the American church in Berlin, and gave his time and resources to it in the same lavish manner with which he devoted himself to his scientific work. He lived a true Christian

life, and up to the last he gave evidence of the Christian faith and a firm belief in the life hereafter. He was a strong man in every way, and his loss to the world at this time is great and lamentable.

Dr. Miller leaves a widow and three children, the oldest, a son, is a medical practitioner in Berlin; a daughter, whose husband is W. G. Cady, professor of physics in Wesleyan University at Middletown, Conn., and a younger daughter about thirteen years of age. Mrs. Miller will probably make her home with her daughter in Middletown, Conn.—N. S. HOFF, Ann Arbor, Aug. 12, 1907.

Notices.

NEW JERSEY DENTAL SOCIETY.

At the thirty-seventh annual convention of the New Jersey State Dental Society, held at Asbury Park, July 19, 1907, the following officers were elected: President, Walter Woolsey, Elizabeth; Vice-President, Frank Gregory, Newark; Secretary, Charles A. Meeker, Newark; Treasurer, H. A. Hull, New Brunswick. The next meeting will be held at Asbury Park.

NORTHERN ILLINOIS DENTAL SOCIETY.

The twentieth annual meeting of the Northern Illinois Dental Society will be held in Rockford, October 16 and 17, 1907. Mark the date in your appointment book, and visit a fine town and a first-class dental society.

A. M. HARRISON, Secy.,
Rockford, Ill.

UNIVERSITY DISTRICT (IA.) DENTAL SOCIETY.

The University District Dental Society, comprising the counties of Linn, Jones, Johnson, Iowa and Tama, was organized in Cedar Rapids, Ia., July 24, 1907, and the following officers elected: President, J. E. Rose, Vinton; Vice-President, J. J. Booth, Marion; Secretary, C. W. Harned, Iowa City; Treasurer, B. H. McKeeby, Cedar Rapids. The next meeting will be held in Cedar Rapids.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The annual meeting of the National Association of Dental Faculties was held at Minneapolis, July 27, 1907, and the following officers elected: President, M. W. Foster, Baltimore; Vice-President, H. B. Tileston, Louisville; Secretary, George E. Hunt, Indianapolis; Treasurer, H. R. Jewett, Atlanta. Executive Committee—D. J. McMillan, Kansas City, Chairman; H. B. Tileston, Louisville; B. Holly Smith, Baltimore; A. G.

Friedrichs, New Orleans; E. W. Branigan, Boston. Ad Interim Committee—J. P. Gray, Tennessee, Chairman; S. H. Guilford, Philadelphia; R. M. Sanger, Orange, N. J.

MINNESOTA STATE DENTAL ASSOCIATION.

At the annual meeting of the Minnesota State Dental Association, held at Minneapolis, August 2, 1907, the following officers were elected: President, Glen F. Andrews, St. Paul; Vice-President, G. O. Orr, Jordan; Secretary, F. E. Cobb, Minneapolis; Treasurer, H. M. Reid, Minneapolis; Master of Clinics, H. D. Lyons, Minneapolis. Executive Committee—Fred S. Yaeger, St. Paul, Chairman. The next meeting will be held in St. Paul.

NEW JERSEY STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY.

The New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination beginning Monday, December 9th, and continue through the 10th and 11th. Practical operating and practical prosthetic work, beginning 8 a. m. Monday, December 9th. Photograph and preliminary credentials must accompany the application. Meeting, State House, Trenton, N. J. For full information inquire of the secretary, Charles A. Meeker, 29 Fulton street, Newark, N. J.

NATIONAL DENTAL ASSOCIATION.

The eleventh annual meeting of the National Dental Association was held at Minneapolis, Minn., July 30 to August 2, 1907, and the following officers were elected: President, William Carr, New York; Vice-President—East, Wilbur F. Litch, Philadelphia; West, Alfred Owre, Minneapolis; South, J. P. Gray, Nashville; Corresponding Secretary, Burton Lee Thorpe, St. Louis; Recording Secretary, C. S. Butler, Buffalo; Treasurer, A. R. Melindy, Knoxville, Tenn. Executive Committee—L. Meisburger, Buffalo; F. B. Kreamer, Minneapolis; M. F. Finley, Washington, D. C. Executive Council—H. J. Burkhart, Batavia, N. Y.; J. Y. Crawford, Nashville; A. H. Peck, Chicago; B. Holly Smith, Baltimore; F. O. Hetrick, Ottawa, Kan. The next meeting will be held in Boston, 1908.

BURTON LEE THORPE, Cor. Secretary,
St. Louis, Mo.

DELTA SIGMA DELTA.

The annual meeting of the supreme chapter of the Delta Sigma Delta dental fraternity was held at Minneapolis, July 30, 1907, and the following officers were elected: Supreme Grand Master, Charles R. Turner, Philadelphia; Supreme Worthy Master, Charles E. Meerhoff, Chicago; Supreme Scribe, R. H. D. Swing, Philadelphia; Supreme Treasurer, J. Q. Bryam,

Indianapolis; Supreme Historian, R. Ottolengui, New York City. The next annual meeting of the fraternity will be held in Boston.

SOUTHERN ILLINOIS DENTAL ASSOCIATION.

The fifteenth annual meeting of the Southern Illinois Dental Society will be held at East St. Louis, Ill., on the 22d and 23d of October. The president and members of the executive committee are putting forth every effort to prepare an interesting program, and it is hoped that every dentist in our territory will do his part to make the meeting a memorable one.

HARRY K. BARNETT, Secy.

INDIANA STATE DENTAL ASSOCIATION.

The Indiana State Dental Association has begun active work in preparing for a Semi-Centennial Jubilee meeting, to be held in Indianapolis, June 4, 5, 6, 1908, celebrating the fiftieth anniversary of the state association.

D. A. HOUSE, Committee on Publicity,
Indianapolis, Ind.

J. Q. BYRAM, Chairman,
Indianapolis, Ind.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

The annual meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held in Chicago, at the College of Dentistry of the University of Illinois, northwest corner of Honore and Harrison streets, beginning Monday, November 4, 1907, at 9 a. m.

Applicants must be in possession of the following requirements in order to be eligible to take the examination: (1) Any person who has been engaged in the actual, legal and lawful practice of dentistry or dental surgery in some other state or country for five consecutive years just prior to application; or (2) is a graduate of and has a diploma from the faculty of a reputable dental college, school, or dental department of a reputable university, or (3) is a graduate of and has a diploma from the faculty of a reputable medical college or medical department of a reputable university, and possesses the necessary qualifications prescribed by the board.

Candidates will be furnished with proper blanks and such other information as is necessary, on application to the secretary. All applications must be filed with the secretary five days prior to the date of examination. The examination fee of twenty ($20) dollars, with the additional fee of five ($5) dollars for a license, must accompany the application.

Address all communications to J. G. REID, Secy.
1204 Trude Bldg., Chicago, Ill.

LATEST DENTAL PATENTS.

38,620. Design, side frame for dentist and barber chairs, James Barker, Philadelphia, Pa.
853,984. Tooth crown model, Chapin F. Lauderdale, Milwaukee, Wis.
854,116. Toothpick machine, George P. Stanley and W. W. Tainter, Dixfield, Me.
854,283. Dental impression and crown-mounting instruments, John M. Evey, Monmouth, Ill.
854,288. Handpiece for dental engines, Frederick W. Dean, Des Moines, Iowa.
854,486. Display-carrier for artificial teeth, Joseph F. Gibson, York, Pa.
854,842. Artificial tooth, Joseph Ramsperger, York, Pa.
854,898. Mouth brace, Hans Lorenz, Rochester, N. Y.
855,875. Dentimeter, Joseph Bode, Philadelphia, Pa.
856,034. Manufacturing dental fillings, inlays and crowns, John N. Crouse, Chicago, Ill.
856,884. Attachment for dental articulators, Milton H. Knapp, Saginaw, Mich.
857,240. Dental tray, James A. Henning, Beardstown, Ill.
857,339. Dental plate swage, Grant E. Freeborn, Belfast, N. Y.
857,414. Tooth-powder box, Walter H. Perkins, Waterbury, Conn.

News Summary.

JOEL E. ADYE, a dentist of Adyeville, Ind., died July 22, 1907.

GEORGE W. LEWIS, a young dentist of Philadelphia, died July 23, 1907.

RICHARD H. REYNOLDS, a dentist of Woburn, Mass., was drowned, July 25, 1907.

ALBERT W. MENDENHALL, 70 years old, a dentist of Wichita, Kan., died July 21, 1907.

A. W. HAZEL, 45 years old, a dentist of Cleveland, Ohio, died suddenly, August 3, 1907.

O. J. MOLYNEUX, 32 years old, a dentist of New Albany, Pa., died from Bright's disease, recently.

G. C. SANDERS, a prominent dentist of Schenectady, N. Y., died from apoplexy, August 1, 1907.

JAMES G. KENNY, 32 years old, a well-known dentist of San Antonio, Tex., died of sunstroke, August 3, 1907.

STEVE H. ROAN, 23 years old, a well-known young dentist of Atlanta, Ga., died from typhoid fever, July 23, 1907.

WILLIAM R. BLACKSTONE, 46 years old, former secretary of the State Board of Dental Examiners and one of the best known dentists in New Hampshire, died at Manchester, August 3, 1907.

CHARLES L. BURROWS, 39 years old, a well-known dentist of Nashville, Tenn., died from typhoid fever, July 23, 1907.

EMMET C. HOLDEN, 58 years old, a dentist of St. Paul, Minn., died, following an operation for abscess, August 8, 1907.

C. L. SIEGLER, 62 years old, a dentist of Doylestown, Pa., died from heart trouble and Bright's disease, July 27, 1907.

EDGAR A. WRIGHT, 63 years old, a pioneer dentist of Lawrence, Mass., died from cancer of the stomach, August 4, 1907.

GEORGE A. VOLCK, a prominent dentist of Houston, Tex., who became insane recently, died at Fulton, Ky., August 10, 1907.

ANTONY VARICLE, Parisian inventor, scientist, balloonist, and formerly a dentist of Seattle, Wash., died in that city, July 26, 1907.

LUTIE SULLIVAN LUCKIE, wife of Robert K. Luckie, one of the most prominent dentists of North Mississippi, died at her residence in Holly Springs, August 16, 1907.

WILLOUGHBY D. MILLER, 53 years old, a native of Ohio, and a professor in the dental department of the University of Berlin, since 1885, which position he had just resigned in order to accept the deanship of the dental department of the University of Michigan, died at Newark, Ohio, after an operation for appendicitis, July 27, 1907.

BE A CONTINUOUS STUDENT.—The professional man has no right to be other than a continuous student.—DR. G. V. BLACK, *Dental Review.*

JUVENILE LOGIC.—"What are you playing, Willie?" "Dentist." "But that is no excuse for hammering on that wash boiler." "Why, how can I be a dentist if I don't dent?"

SMALL RECOMPENSE.—A New York woman got a verdict of six cents against a dentist who had tried to kiss her and failed, which seems small recompense for a disappointment.

FIRES.—Benjamin West, St. Louis, Mo., August 5, total loss.—George E. Mitchell, Haverhill, Mass., August 4, badly damaged by smoke.—Thompson & Martin, Scranton, Miss., August 6, loss unknown.

THOROUGHNESS.—Thoroughness in dentistry means doing everything known to us to prevent decay of the teeth and the various degenerative processes in the oral cavity.—DR. L. C. BRYAN, *Dental Cosmos.*

TO CLEAN IMPRESSION TRAYS.—Put the trays and a piece of sal soda the size of a walnut in half a gallon of water and boil for fifteen minutes. Take out the trays, and wipe dry while warm.—J. R. HULL, *Western Dental Journal.*

INCONSISTENT.—Edyth—I would never marry a man who leads a hand-to-mouth existence. Mayme—What! Do you mean to tell me your engagement with Fred is off? Edyth—Certainly not. Why? Mayme—He's a dentist, you know.

HAS FORTY-FIVE TEETH.—While the average man is satisfied with a maximum of 32 teeth, a Turk, near Baiburt, in Asia Minor, boasts of

45, all perfect. He belongs to a well-toothed family, his mother and a sister each having the same number.

To Sharpen Hypodermic Needles.—Hypodermic needles will get dull. Put the wire through the length, and grind the needle, and wire together. The wire can be withdrawn, carrying any bur with it that could clog the needle.—Dr. F. D. Spooner, *Summary.*

Needed in Meadows.—A good dentist, a good shoemaker, a good tinner and another good blacksmith. In all of these the "good" is emphasized. There is no dentist, shoemaker or tinner here, and our blacksmith has more than he can do.—Meadows (Idaho) *Eagle.*

Talks to Dentists.—Dr. T. Franklin Gifford of St. Louis addressed a meeting of Milwaukee dentists recently, on the question of "Oral Hygiene in Public Schools—Its Relation to Dentistry and Medicine." The movement has been taken up all over the country, a fund of $50,000 a year having been provided by C. G. Luyties of St. Louis.

The Ringling Bros. Circus, as far as relates to its ability to meet all requirements, is a city within itself. It has its own police force, two doctors, a dentist, a lawyer, eight barbers, a shoemaker, a tailor, four blacksmiths, three carpenters, two painters, an electrician, a postmaster, four sailmakers, three laundrymen, and many other skilled workmen.

Professional Men Should Work Together.—As professional men we should work together for the benefit of all the people, and so manage our dental education as to secure this end. If we work together, with zeal and skill to that end, our profession will win high honors in the future.—Dr. G. V. Black, *Dental Review.*

Skillful Dentistry Recognized and Recommended by the Daily Press. —Regular visits should be paid to the dentist, who will examine your mouth and tell you if there is any decay. It is as well to go to the most expert practitioner your means will allow, as often the work of an unskillful dentist does more harm than good.—*Chicago Daily News.*

Illegal Practitioners.—A dentist of Sacramento, Cal., has been arrested for practicing dentistry without a license. He gave bail and was released from custody.—A Toronto man, proprietor of a dental parlor in Hamilton, Ont., charged with practicing dentistry without being a member of the Royal College of Dental Surgeons, has been fined $20 and costs. He claims he employs qualified dentists only to do his work for him. An appeal will be entered.

Teeth as Souvenirs.—A curio collector reports an unprecedented demand for false teeth. "It is the teeth of famous personages, deceased, that are wanted," he said. "I don't know for sure what has started the boom in artificial teeth. Ever since I have been in this business I have had occasional requests from eccentric patrons for a set of somebody's teeth, but in the last few months inquiries have simply poured in concerning the teeth of men prominent in the last century. I am inclined to think that this craze for teeth has been stimulated by the report that Washing-

ton's false teeth had been stolen out of a museum in Baltimore."—*New York Sun.*

A GRATIFYING METHOD OF FINISHING AMALGAM FILLINGS IN INTERPROXIMAL SPACES.—After removing the matrix band, draw back and forth a moistened strip of rubber dam, as you would sand paper in finishing gold. Do this before the amalgam has set thoroughly, and you will have an excellent cervical margin and a surface that will need no further polishing. If rubber is stretched no metal will overhang the margin.—DR. L. E. PHELPS, *Dental Summary.*

FATALITIES.—A woman of Salida, Colo., died recently, the result of having seven teeth extracted, causing inflammation of the inner lining of the stomach.—A man of Edina, Mo., died in a dental chair, July 26, after chloroform had been administered.—A man of Detroit, Mich., pulled tooth with string; died a few moments later. Cause, a weak heart.—A man of Kansas City, Mo., expired in a dentist's chair, July 15, while under the influence of chloroform.

THOMAS W. EVANS' ESTATE.—The dispute over the large estate of the late Thomas W. Evans, the famous American dentist resident in Paris, who assisted the Empress Eugenie to escape at the fall of the second empire, is now reported settled. As a result the Thomas W. Evans Museum of Philadelphia will receive some $2,000,000, while the heirs at law will receive $800,000. An agreement is said to have been reached in Paris between representatives of the museum, the Philadelphia district-attorney and the heirs.

EXTRACTING TOOTH OF AN ELEPHANT.—Perhaps the greatest dental operation on record was performed upon an elephant some years ago in the City of Mexico. The aching tooth was 12 inches long and four inches in diameter at the root. After Mr. Elephant had been securely fastened by chains his mouth was pried open and a quantity of cocain applied to deaden the pain. When this was done a hole was bored through the tooth and an iron bar inserted; then a rope was twisted around the bar, four horses attached, and the tooth pulled out.

THREE WAYS OF DOING THOROUGH WORK.—There are three ways of doing thorough work, and of doing our duty by our patients and ourselves. If the number of patients is too great to enable us to do them full justice —(1) One should recommend the patients requiring special work to practitioners one knows will do justice to this special work. (2) Secure the services of an able and thoroughly qualified assistant, and train him to one's own methods of practice. Or (3) raise fees, so that those who do not appreciate thorough work may go elsewhere. The latter course does not usually work well in reducing a practice, because those who are thoroughly treated, and have confidence in the operator, will gladly pay a higher fee as their dentist becomes more able and efficient, rather than go to another man not so careful of every detail; and if they do, they will return to you upon finding that they are not being thoroughly looked

after, and that their dentures degenerate every year and become less useful at that period of life when they are mostly needed—"when the sound of the grinding is low."—DR. L. C. BRYAN, *Dental Cosmos.*

DENTISTS FOR NAVY.—With 30,000 enlisted men in its service, dependent almost wholly on the aid they receive aboard ship, there is not a dentist in the whole naval service. This is the showing that Surgeon-General Rixey will make to Congress at its session this winter. He will urge, in the strongest terms possible, that Congress pass a law authorizing the reorganization and enlargement of the naval hospital corps, the employment of a sufficient number of dentists to attend to the needs of the 30,000 enlisted men in the service and the creation of a corps of women nurses.

INTELLIGENCE AND SKILL THE PROPER BASIS OF VALUE.—It is not the material with which a tooth is filled that makes it worth something, it is the intelligence of the operator transferred to the tooth that makes it of value. It is not the actual labor in a filling, but the skill with which it is done that constitutes the proper basis of value of an operation. When once your patients become aware of the fact that you base your fees upon the system of professional services rendered, they will never fail to reward you for such services as you render.—DR. CECIL CORWIN, *Pacific Dental Gazette.*

THE USE OF THE TOOTHBRUSH.—The best natural friction comes from the masticatory force, but the best artificial friction is from the toothbrush used with one motion, and, as I see it, one motion only. A rotating over gum and tooth, starting each rotary motion with the bristles flatly placed upon the gum over the roots of the teeth and rotating occlusally with a fairly stiff brush. This method includes the gum as well as the tooth in this semi-revolving motion, and if conscientiously done five to six times a day in these cases, the results will be gratifying.—DR. G. H. OWEN, *Dental Era.*

TOOTHBRUSH CAUSE OF RECESSION.—Those who have followed the papers or writings of specialists know that careful and frequent polishing of the necks of the teeth with hard-wood polishers and pumice powder, together with massage of the gums, will prevent this recession and bring the receding tissues down again, and that improper or too much brushing with unsuitable brushes is a cause of recession. That this is the case is proved by the fact that the gums do not usually recede on the palatal surface of the teeth, on which only the tongue does the cleaning.—DR. L. C. BRYAN, *Dental Cosmos.*

A COLLIE DYING OF GRIEF.—Watch, an unusually handsome and intelligent black collie, is slowly dying of a broken heart over the loss of its master, Dr. S. P. Henkle, who died of typhoid fever in Allegheny General Hospital, May 13. Dr. Henkle was a dentist, with offices in the Hale Building, Sixth street and Penn avenue. Watch was seen at Allegheny City Hall disconsolate, because his usual haunts were closed on Sunday. Since the death of the dentist the dog has been making the

rounds of the regular haunts of his late master daily. He refuses food when it is offered, and several persons have tried to entice the dog to make his home with them.

DENTISTS MAKE A RECORD.—The eleventh annual convention of the National Dental Association recently held at Minneapolis, is pronounced the greatest ever held, not only in point of size, but also as to arrangements and accomplishments, in the history of the association. The registration at this convention was almost twice that of the largest previous convention. Just 1,169 dentists registered in Minneapolis, while the largest registration ever before known was 600. The largest convention of dentists ever held in the United States was the International convention, held at the St. Louis World's Fair, at which the registration exceeded by only thirty names the national one just closed.

DIVORCES.—Mrs. Irma Murphy, wife of Walter B. Murphy, a dentist of Milwaukee, Wis., has been granted divorce on the ground of non-support and given alimony of $3 a week.—Mrs. Pauline Kelley, wife of Henry W. Kelley, a dentist of Pittsburg, who sued for divorce some time ago, has been granted $50 for counsel fees.—Harry Armstrong, a dentist of Chicago, has filed suit for divorce against his wife, Mrs. Delia Armstrong. This is what he charges she did to him: July 30—Beat and bruised his head with her fist. July 1—Struck him with a chair and threw it at him. March 18—Struck him in the eye with her fist. She now threatens, he declares, to prevent his patients visiting his office.

CLEANLINESS IN BRIDGEWORK.—Where there are short teeth and full ridge, make the occlusal surface as narrow as it will justify. Don't jam your facing of dummies up against the festoon of gum around the crowned tooth. Allow free space. In lower bridges, on the side arches, I favor an occlusal suspension without teeth or facing extending down to the gum, for it is the hardest place in bridge work to clean, and by suspension, it leaves a free open space that is almost a self-cleanser. And last, caution your patient that the life of the bridge depends largely on cleanliness. That with crown and bridge work it is even harder to keep clean than natural teeth and require more diligent service with mouth washes, brushes, ligatures, etc.—DR. T. J. NEWMAN, *Dental Era.*

TROUBLES OF VARIOUS DENTISTS.—A dentist of Bridgeport, Conn., was fined $5 and costs for threatening to shoot a former friend, July 22.—A dentist of San Francisco, Cal., dean of the dental department of one of the colleges, has been obliged to sever his connection therewith on account of the charge of "boodling" preferred against him.—A dentist of Cleveland, Ohio, recently purchased a $250 diamond ring from a customer with a hard luck story. Later he was arrested and held in $500 bail, charged with receiving stolen property.—A dentist of Port Huron, Mich., who disappeared several weeks ago, leaving a number of unpaid bills, has been located in Chicago.—A dentist of Toledo, Ohio, has been sued for $30,000 damages, said to have been caused by breach of promise to marry.—A

dentist of Marshalltown, Iowa, is seriously ill as the result of having a tooth removed while in attendance at a clinic at the National Dental Association at Minneapolis. His illness is the result of cocain poisoning.—A dentist of Sheboygan Falls, Wis., was recently committed to the Northern Hospital for the Insane.

MARRIAGES.—George Oliver Bartlett, a dentist of Cambridge, Mass., was married to Miss Charlotte E. Holmes of North Cambridge, July 31, 1907.—R. C. Davis, a dentist of Coldwater, Mich., was married to Miss Eldeva A. Pomeroy of Jonesville, July 26, 1907.—John E. Evkit, a dentist of Boston, Mass., was married to Miss Josephine H. Mink of Somerville, July 29, 1907.—George E. Melchior, a dentist of Algoma, Wis., was married to Miss Elizabeth Herald of Oconto, July 27, 1907.—H. E. Rose, a dentist of East St. Louis, Ill., was married to Miss Adele Meyer of St. Louis, Mo., July 25, 1907.—Emil Raeder, Jr., a dentist of Brooklyn, N. Y., was married to Miss Bertha Esper of the same place recently.—William R. Wickersham, a dentist of St. Louis, Mo., was married to Miss Josephine N. Ghio of St. Louis, July 31, 1907.

WORK FOR AMERICAN DENTISTS IN INDIA.—Consul-General Michael writes from Calcutta as follows: "The loss to the English army of good men who would re-enlist, but are rejected on account of bad teeth, has aroused the army officers to a degree that has resulted in bringing about a reform in the matter of care of soldiers' teeth. The army council has approved a money allowance for the treatment of teeth by civil dentists. Several soldiers were recently sent to a dentist to have their teeth put in order before examination for re-enlistment, and they were put in form to pass. Thus good men were saved to the army who would otherwise have been rejected. As Englishmen prefer American dentists to all others, this reform in the English army will doubtless be of benefit to American dentists who are located where their services are available."

WHERE TEETH ARE WORSHIPED.—An American traveler recently delivered a lecture before a distinguished audience at the home of a wealthy New Yorker. On the table before him stood one lone object. Said the traveler: "While I was in India, three royal commissioners were sent there by the king of Siam to negotiate for the purchase of a certain tooth. They failed in their mission, however, their offer of the surprising sum of $250,000 for the much-coveted tooth, being declined. The tooth in question came, as the Hindus believe, from out the mouth of Buddha—the founder of the foremost religion of the Orient—and hence for 2,400 years that tooth has been the object of worship. It is enclosed in a golden casket in a shrine in the great Inner Temple at Kandy, and attracts thousands of worshiping pilgrims from far and near, every year, and has never been exposed to the gaze of an unbeliever. In hundreds of other shrines in India, the teeth of human beings are worshiped by Hindus, who, above all, value good teeth as the reward of good ancestry and of eternal vigilance in the care of the body. We Americans can

certainly learn a lesson from the Hindu worship of teeth—the lesson of respect for one of the most important parts of our bodies. For good teeth are not only veritable jewels in the mouth of beauty, but indicate good health, good breeding and refined habits."

FREE TEETH TO MEN INSURED BY KAISER.—Germany to Furnish Those Contributing to Government Pension Fund.—According to a law, which has just received the signature of the chancellor of the empire, all workingmen insured by the government are to be supplied with artificial teeth, in case they need them. In the very near future the imperial insurance department will open, in the part of the city of Berlin where most workingmen live, dental institutions, where all policyholders of the working class may have their lost teeth replaced. In indorsing this bill the government made the point that it is not to be considered as a charity, because it is believed that the men with good teeth will be less likely to make claims on the department, and thus considerable money will be saved. An amount of $25,000 is to be spent on instruments and fittings of the dental institute.

DAMAGES.—A dentist of Sac City, Mich., has sued the Sac City Electric Company for $25,000 damages. He alleges that in September, 1906, he received the entire voltage of the electric system and was so fully charged with electricity that his hand was burned and fully destroyed, his nervous system injured, and he was incapacitated for his profession.—A woman of Holyoke, Mass., has sued two dentists of that city for $2,000 damages. She alleges she was given ether to have some teeth extracted, and in the operation one of the pulled teeth went down her trachea. When she regained consciousness the dentist failed to tell her, and she subsequently suffered an illness from the accident.—A dentist of Peoria, who recently sued a bill, has been given a decision in his favor. The defendant claimed that the dental work was not done according to agreement. It is probable that the case will be appealed.

THE DENTIST'S INSANE PATIENTS.—Dental treatment for the insane is rather different from that for the ordinary person, said a dentist who attends to the teeth of the patients in several of the city institutions. "For one thing, it is confined chiefly to tooth extracting, because the city cannot pay for the filling of teeth. When I do that, the expense has to be borne by some relative or friend of the patient. I go to four institutions in all, and sometimes pull as many as three or four hundred teeth in a week. Many of those whose teeth are troubling them have no more idea what is the matter with them than an animal would have. They go around with their hands to their faces, but they cannot locate or define the pain. I examine their teeth, and if one looks as if it ought to come out, why I pull it. There are some of the patients, of course, who are only monomaniacs, and they are as rational on the subject of their teeth as anybody could be." On account of the amount of practice he has in tooth pulling, this dentist is considered an expert in that branch of the profession, and many other dentists send him the more

difficult cases for extraction that come to them. He would be quite willing to dispense with this mark of respect for his skill, but dodging it seems to be a difficult task.—*New York Times.*

ACCIDENTS.—July 24, the vulcanizer in Dr. G. W. Gibson's office at Michigan City, Ind., exploded and was blown to the ceiling, making a deep impress in the plaster, and in falling missed Dr. Gibson's head only by a few inches.—July 27, Dr. M. W. White of Yorkville, Tenn., broke one of his ribs while engaged in extracting a tooth.—July 24, Dr. P. S. Wilbur, Bakersfield, Cal., lost the tops of four fingers by the explosion of a cartridge. The accident is likely to incapacitate him from following his profession.—July 31, Dr. George E. Rice of New York City narrowly escaped being killed. After driving his automobile aboard a steamer, he attempted to shut off power, but, owing to insufficient headroom, was unable to reach the levers. The machine, with Dr. Rice on board, passed out through the opposite gangway and sank out of sight. Dr. Rice was pulled out and a diver brought the machine to the pier.

NOBLE FOLK HIDE THE DENTAL SECRETS.—Dr. Lyman C. Bryan of Basil, famous dentist of Switzerland, was at the Minneapolis meeting, and in talking of the American dentists in Europe, he said: "The success of Americans in dentistry has been phenomenal in Europe, but the countries have passed laws which will eventually drive them out. They have to pass the most exacting preliminary examinations, whereas a practical one is really all that is necessary. There are examinations in the language of the country, also, and a collegiate course through the bachelor of arts before they are allowed to enter the colleges." Dr Bryan, just before coming to America, did the dental work for one of the Austrian princes. "The aristocracy," said Dr. Bryan, "are most particular that no one shall know about any work that is done on the teeth. They will not have gold in their mouths, if they can help it, preferring the porcelain, which is not noticeable. They go to an office in a closed carriage, and even the members of their own families never know of any work they have done."

TEETH AS A SOCIAL FACTOR.—The teeth of a nation are a much neglected asset, and the British Dental Association has been considering means for improvement as a national affair. Investigations have indicated that not more than three per cent. of all children of school age have sound teeth. How great is the influence of this in retarding development and producing weak and improperly nourished bodies cannot easily be estimated, but it is doubtless true that much dyspepsia and illness have resulted from poor teeth. In the South African war the inability of the soldiers to masticate ordinary food caused enormous waste of supplies, while defective teeth explain the rejection of a very large part of army recruits. To bring about a reform it seems necessary to make attention to the teeth of school pupils' a public matter, and a conservative estimate is that Great Britain's outlay for this purpose should be at least $6,000,000 a year.

ANCIENT ART OF DENTISTRY.—While unthoughtful moderns, says the London *Globe,* regard dentistry as being virtually a science of our own age, archæologists know that it was practiced among the ancients. The museums of Rome and other places in Italy possess various specimens of dentists' work, dating from before Christ, and another such a specimen has recently been discovered in the jaws of a skeleton found in a tomb at Teano. The skeleton is that of a woman, and from the jaws there was extracted a gold mount containing six teeth. A peculiar fact about the find is that the teeth, although "flapped" with gold, were undoubtedly natural, and the theory is formed that the ancients used gold flaps or rims to steady loose teeth. For artificial teeth the dentists of the Old World had a fancy for animal teeth, especially bovine, by reason of their hardness, although occasionally a person in poverty would sell one for sufficient consideration.

UNIFICATION OF THREE STATE DENTAL ASSOCIATIONS.—State Dental Associations of Washington, Oregon and California will be consolidated at the annual meeting, to take place in Spokane, Wash. Former President Cutler of the Washington Association has been appointed a committee of one to arrange for the unification, the plan of which is to endeavor to promote uniform dental laws, and thus make certificates interchangeable between the three states. These officers were elected at the session at Seattle: President, Dr. R. A. Monroe, Spokane; Secretary, A. S. Oliver, Spokane; First Vice-President, Dr. J. K. Appleby, Everett; Second Vice-President, Dr. Lizzie C. Stuart, Seattle; Treasurer, Dr. S. L. Monk, Montesano.

There are three vacancies in the Board of Dental Examiners, and among the candidates proposed to fill the vacancies are Dr. J. W. Dunning and Dr. R. E. Shanks of Spokane.

THE DENTIST OF THE FUTURE.—That the dentist of the future will differ as much as the barber-surgeon of old does from the present day dentist, will unquestionably be true, yet, perhaps, not in all points, for as long as human beings exist there will be some among them with some of the same old faults and virtues. His education will be on broader lines, and he will be more thoroughly grounded in the specialty that he adopts. Not over-educated, nor over-trained, but will be practical to the core, and his fingers will be taught to think as well as his head. He will adopt some specialty, viz: Dentistry, Oral Surgery, or Stomatology. In fact, the change is gradually taking place now, for dentistry which is a specialty itself, is already being specialized, and the day is not far distant when specializing will be still more pronounced. All the discoveries in dentistry have not yet been made, nor has the subject been written and talked out. There remains much to be learned.—DR. FRANCIS M. PARKER, *Pacific Dental Gazette.*

HE PROVES HIS DEVOTION.—A dentist received a call the other day from a couple whom he soon had reason to believe were lovers. The girl had an aching tooth, and as they entered the young man said: "Now, darling,

the worst is over. Just take a seat, and it will be out in a minute." "Oh, I daren't!" she gasped. "But it really won't hurt you at all, you know." "But I'm afraid it will." "It can't. I'd have one pulled in a minute if it ached." "I don't believe it." "Well, then, I'll have one pulled out just to show you that it doesn't hurt." He took a seat, leaned back and opened his mouth, and the dentist seemed to be selecting a tooth to seize with his forceps, when the girl protested, "Hold on! The test is sufficient. He has proved his devotion. Move away, Harry, and I'll have it pulled." She took the chair, had the tooth drawn without a groan, and as she went out she was saying to the young man: "Now I can believe you when you declare that you would die for me." And yet every tooth in his head was false.

ROBBERIES.—Drs. E. A. Upton and Lucius Fuller, Oakland, Cal., a quantity of gold.—A. W. Taylor, Berkeley, Cal., July 14, $100 worth of gold bridges and crowns.—H. W. Boone, Champaign, Ill., August 7, $40 worth of gold.—W. A. Loud, Brockton, Mass., July 28, crowns, bridgework and gold fillings, valued at $40.—Drs. Tellman and Quinn, Muskegon, Mich., July 26, $200 worth of gold leaf.—Dr. Cunningham, Manistee, Mich., in July, $75 worth of gold.—A. J. Parsal, Benton Harbor, Mich., July 24, a quantity of gold.—A. W. Weible, Jamestown, N. Y., $100 worth of gold foil and bridges.—M. S. Rees, Toledo, Ohio, July 20, dental supplies valued at $50.—H. C. Carroll and Ira A. Smith, Meadville, Pa., July 19, gold valued at $20 from each.—W. H. Sedgwick, Newark, Ohio, July 19, gold plate and solder valued at $25.—Union Dental Company, Salt Lake City, Utah, August 2, contents of display case, amounting to about $50.—J. W. Kleeber, Oshkosh, Wis., July 28, $10 worth of crown gold, a silver thimble and several other small articles of value.

DENTISTRY, ANCIENT AND MODERN.—In the Nuova Antolgia (Rome) is a curious article by Ernesto Mancini on "Teeth and Dentists in Ancient Times," with a number of illustrations of dental work among the ancients from museum specimens. The first mention of tooth extracting in literature seems to be by Cicero, who names Esculapius (the third) as the inventor of purges and the art of extracting teeth, some thirteen hundred years before Christ. Hippocrates, four centuries before Christ, wrote much about the care of the teeth, and a tomb at Tanagra, of about that period, furnished a set of false teeth. The discoverer of this relic has also found in Greek tombs teeth filled with gold. But before Greece, dental art flourished in Assyria, in Egypt and in Phœnicia, and from there the art reached the Etruscans. Benzoni asserts that he has found artificial teeth of sycamore wood attached by gold wire to sound teeth of mummies, and also in mummies from Thebes decayed teeth filled with gold so well that the metal adhered perfectly to the ivory. Other authorities deny this, or claim that the art, if known, was not practiced, on account of religious objections. Various public and private collections have specimens of ancient dental work. The illustrations given are of Phœnician teeth bound together with gold wire, gold teeth in the Etruscan museum, and the Bruschi-

Falgari museum, of Corneto, Italy, and a specimen that is practically "bridgework" three thousand years old, found at Cervetri, and now in the Castellani private museum. The museum of Pope Julius, at Rome, has a skull with a plate fitting over three sound teeth and having a compartment for a false tooth. In the museum at Florence is perhaps the oldest specimen of dental work in Italy—a skull with the incisors bound with a gold band, and dating from the fifth century B. C., according to the pottery found in the same Tarquinian tomb. Dentistry declined in Europe after the early centuries of the Christian era, and St. Louis of France is said to have had but a single tooth left at his death, while Charles the Bold was recognized dead on the Field of Nancy by the gaps in his set of teeth.—MEDICAL RECORD.

INVESTMENT PLASTER.—An investment plaster of the most reliable and inexpensive kind can be made by any dentist from the following formula:

Good quality of ordinary dental plaster of Paris	2 parts
Powdered mica	1 part
Marble dust	1 part

The mica and marble dust should be pulverized as finely as flour for the finest work. The mixing of these ingredients should be carefully and thoroughly done, to make a uniform mixture. In gauging proportions it is important that the parts be taken by measure. This compound will be found to possess all the good qualities desirable in an investment plaster, and specially adapted to every department of the dental laboratory where an investment plaster is required.

The pulverized mica, or mica flour, can be obtained from the United States Mica Mining and Milling Company of Micanite, Colo. Main office in Chicago, Ill.—H. A. CROSS, D.D.S., Chicago, Ill.

HOLLOW GOLD INLAYS AND MODE OF TAKING IMPRESSIONS FOR SAME. DR. T. S. PHILLIPS, BUFFALO, N. Y.—Many articles have been published in the dental journals on gold-inlays, and many good points have been advanced; yet the easy way of producing same has been overlooked. Cavity preparation we will pass, since all who do inlay work are supposed to understand this.

We will cite a case of a cavity in the first molar, requiring large restoration on occlusial as well as approximal surfaces. First, take an impression in a capsule the proper size with modeling compound, after wrapping same with paper, spray with ethylchlorid on the bottom of capsule, and pour with fusible metal, hot enough to flow freely; then plunge into cold water. It will be found to separate from compound without sticking, and with sharply defined margins; next take pure gold 36-gauge, large enough to cover the whole free margins of the cavity, and burnish into the deep parts and to the walls as near as can be done without tearing same; then remove, anneal and return to fusible die and strike up same in swager; this will give an approximal fit to the cavity; anneal again, carry to cavity and burnish to walls and margins perfectly, place on the die and cut hole through your matrix at deep part, say, one-third of the

entire surface, then carry to the cavity and burnish; now place a ball of wax a little larger than the cavity in the matrix, and while still in the tooth instruct the patient to bite on same, which will force the wax to the approximal surface of the adjoining tooth, remove and relieve as desired the approximal surface and contour same to the desired shape; also relieve the occlusial surface about the thickness of 36-gold, exposing the margins of the matrix all around; now invest same in plaster, wax down, then remove and pour with fusible metal; strike up in 36-gold a piece, which will cover both the occlusial and approximal surfaces. Trim to the margins of the cavity matrix, wax the two pieces together, after removing the wax from the matrix; invest in sump, filling same through the hole extending far enough to tie at *points* the piece waxed to same; now solder the margins with 20-carat solder. After pickling, place inside through the hole small pieces of solder of lower grade, and flush the same over a Bunsen burner, using enough to give the desired thickness; remove and finish, and you will have an inlay that when set will be as near perfect as can be, if directions have been carefully followed. The articulation will be found nearly perfect. In my opinion the hollow inlay possesses more advantages than one made solid, as the cement has a large body projecting into it, thus adding to its retention.

A Good Impression.—It should be the aim of every practitioner, whether he be a recent graduate or one of some years of experience, to impress his patients with the fact that he is in dead earnest. I know of no surer means of creating the desired impression than *system* about the conduct of office and practice. Let it be understood at the beginning that appointments are to be kept, both on his part and yours, since time represents money.

Neatness is a valuable watchword; for dust, soiled linen or questionable cleanliness about instruments will never add to your fame.

Obviously, one cannot observe the same stereotyped form of receiving patients, but when one is in your chair proceed systematically. Begin with a thorough cleaning and polishing of teeth, make a careful examination of all hard and soft tissues, taking one tooth at a time, and record what you find on a blank, with patient's name, the date, and the name of the person who referred him to you.

An explanation of your chart (Allen's preferred) is always of interest to the patient, and never fails to impress the fact that nothing is to be overlooked. Should you think best, name the cost of work contemplated, or, if an estimate is requested, be careful to have it understood that you are giving only an approximate estimate, and then note it down in the space for that purpose. Don't fail to bear in mind that lawyers make their living out of misunderstandings. Any agreements as to payments should be noted, and let it be known that you expect them to be kept.

It is a poor rule that does not work both ways. Do your part faithfully, and should conditions arise that are not anticipated tell the patient at the time, for it may otherwise be a cause for dispute. Be absolutely

honest in your dealings, and for no reason advise a patient to have work done that your better judgment tells you will result in failure. We are all familiar with the requests for crowns or bridges that we know are not indicated. Do not humiliate the patient because of his lack of information, for he may have been advised by a well-intentioned friend. Explain to him your reasons, and you will be thanked for the trouble, if not more substantially remunerated. Refrain from egotism, and always show respect for the opinions of others. Many times this will keep you out of trouble, for it is not always easy to "make good" after a mistake is once made.

It is quite generally conceded that professional men are poor business men; try to correct the prevailing opinion by rendering your statements monthly and without apology for so doing. Your dealer and landlord expect their money twelve times a year, and this is not a bad thing for your patients to know. Honest work deserves good pay and is appreciated very much in proportion to the estimate you place upon it.—S. D. RUGGLES, *Dental Summary.*

DESENSITIZING DENTIN.—Very often we are called to excavate cavities where decay has extended over the greater part of the tooth, and its removal is an extremely painful operation. With children this is a very difficult task. I have devised a most successful method, as follows: Before attempting to remove the decay, protect the cheek and tongue with cotton rolls; then, with a silver nitrate point, thoroughly saturate the decay with the nitrate. Dry out the cavity and seal with a thick solution of chloropercha and cotton, leaving it in the tooth for a few days. When the patient returns you will find the decay very dark, and it can be removed with very little pain. Small carborundum stones instead of burs are a great help in preparing sensitive cavities.—C. J. HADLEY, *Dental Review.*

HE HELD ON.—"In a town back in Vermont one time," said a doctor, "a big, husky lumberman entered the office of a dentist I know and showed the doctor a bad tooth. The dentist decided that the tooth should be pulled."

"'All right,' said the lumberman. 'But listen now. If I tell you to stop, you stop pulling or I'll beat you up.'

"The dentist agreed, and the lumberman got in the chair. The dentist took hold of the tooth, and began pulling. Almost immediately the lumberman yelled, 'Hold on!'

"The dentist continued to pull. 'Hold on!' yelled the lumberman. The dentist kept pulling and the tooth came out. Then the lumberman jumped from the chair mad.

"'Why didn't you stop when I told you to?' he asked fiercely.

"'You didn't tell me to stop,' said the dentist.

"'I did too! I yelled "Hold on!" twice.'

"'Oh,' said the dentist innocently, 'I thought you meant to keep hold of it.'

"The lumberman believed him and cooled off."—*Denver Post.*